

CITY AIRPORT DEVELOPMENT PROGRAMME
(CADP)S73 APPLICATION

Appeal against the refusal of Section 73 application
22/03045/VAR

London City Airport Limited
(PINS ref: APP/G5750/W/23/3326646)

Noise Proof of Evidence of Richard Greer

On behalf of London City Airport Limited

7 NOVEMBER 2023



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1. Introduction

1.1 Introduction

- 1.1.1 This Proof of Evidence deals with the noise evidence in respect of the Section 73 Planning Application by London City Airport Limited (“the Appellant”), to amend the City Airport Development Programme 1 (CADP1) planning permission, 13/01228/FUL (as varied¹), granted in July 2016, which is the subject of this Appeal (the “S73 Application”).
- 1.1.2 I provide a summary as well as conclusions at Section 13.

1.2 Qualifications and experience

- 1.2.1 I am Richard James Greer, BSc(hons).
- 1.2.2 I am instructed to provide my evidence on behalf of the Appellant.
- 1.2.3 I am a Director at Arup and an Arup Fellow.
- 1.2.4 My qualifications and experience of relevance to this case are:
- a. a Bachelor of Science honours degree in Engineering Sound and Vibration;
 - b. 35 years’ experience in environmental noise and major infrastructure projects (including, for example, noise strategic lead for Heathrow and Luton airport expansions as well as HS1, HS2, Crossrail, Thameslink, Queensferry Crossing, A14 Cambridge to Huntingdon and Thames Tideway Tunnel);
 - c. an experienced expert witness for applicants, objectors and Rule 6 parties;
 - d. a past Fellow of the Institute of Acoustics;
 - e. a past longstanding board member of the Association of Noise Consultants; and
 - f. a past member International Standards Organization (ISO) working groups regarding noise and vibration matters.

1.3 The S73 Application

- 1.3.1 London City Airport (“the Airport”) presently operates under the following key CADP1 conditions:
- a. A passenger cap of 6.5 million passengers per annum (mppa);
 - b. Restricted to a total of 111,000 annual aircraft movements;
 - c. A limit of 45 aircraft movements per hour;
 - d. A restriction of 25 aircraft stands available for commercial (passenger) aircraft;
 - e. Restricted opening times of 0630-2230 Monday to Friday, 0630 – 1300 Saturday and 1230-2230 Sunday, with the last half hour in each case available for late movements only;
 - f. A limit of 400 late movements outside of the core operating hours to allow for flights which are unavoidably delayed; and
 - g. A limit of 6 movements in the half hour between 0630-0659 each day, with a limit of 2 movements in the 0630-0644 period.

¹ There have been a number of non-material amendments to the application.

- 1.3.2 The S73 Application is seeking permission for the following proposed amendments:
- An increase in the number of passengers able to use the Airport each year, from 6.5 million currently permitted to 9 million per year (expected to be achieved by around 2031);
 - An extension of operational hours on Saturday to allow flights and aircraft maintenance activity to take place through the afternoon up to 1830 hours, with an additional hour for arriving flights up to a maximum of 12 during British Summer Time² and consequential amendments to the number of flights permitted at weekends;
 - An increase in the actual number of flights permitted to land and take-off between 0630 and 0659 (from a maximum of 6 to a maximum of 9), with an increase in the number permitted between 0630 and 0644 from 2 to 4;
 - All movements during additional operating hours and the additional slots in the early morning period for use only by cleaner, quieter, new generation aircraft; and
 - Greater flexibility in the parking locations of the already permitted aircraft to allow for the wider wingspan of new generation aircraft.
- 1.3.3 There are also minor design changes to the original CADP1 works, including to the forecourt and airfield layout.
- 1.3.4 These changes are referred to as the ‘Proposed Amendments’. The CADP1 scheme as amended by the Proposed Amendments constitutes the ‘Proposed Development’ and is the ‘Development Case’ considered in the Environmental Statement (ES) submitted with the S73 Application (CD1.8 to CD1.61).
- 1.3.5 There will be no change to the number of aircraft movements currently allowed at the Airport each year at 111,000; no change to the permitted hourly runway movement rate at 45 movements per hour; and no increase in the number of aircraft stands above 25 or other changes to the airfield infrastructure. The design and layout of the new terminal buildings and further enhancements to the Airport campus, which were approved in 2016 under the CADP1 permission, will remain substantially unaltered and these will be built out commensurate with the recovery of passenger demand, albeit at a slower pace than originally envisaged prior to the onset of the Covid-19 pandemic.
- 1.3.6 The Proposed Amendments will allow the Airport to respond to passenger demand to 2031 in a sustainable way and will incentivise the transition to ‘new generation’ aircraft, such as the Embraer-E2 family or Airbus A220 series aircraft, which are quieter than current passenger jet fleet at LCY.

1.4 Scope and structure of this proof

- 1.4.1 In preparing my evidence I have had due regard to:
- The Appellant’s Statement of Case (“SoC”) (CD10.1);
 - The London Borough of Newham (“LBN” or “the Council”)’s SoC (CD10.2);
 - The Rule 6 party’s SoC (CD10.3);
 - The evidence of the following witnesses for the Appellant;
 - Louise Congdon (need, forecasting and socio-economics) (APP/1); and
 - Sean Bashforth (planning) (APP/3), including the appendices to this evidence.

² Which aligns with the IATA Summer Scheduling season from the last Sunday in March each year to the last Sunday in October

- 1.4.2 In my evidence I shall:
- a. introduce myself and explain the scope and structure of my evidence (Section 1);
 - b. set out the Reason for Refusal that relate to noise and the Proposed Development (Section 2);
 - c. set out the legislation, policy and guidance relevant to the Proposed Development (Section 3);
 - d. summarise the consultation undertaken for the Proposed Development (Section 4);
 - e. summarise the relevant aspects of the noise assessment for the Proposed Development as follows:
 - describe the assessment methodology (Section 5);
 - summarise the embedded noise mitigation and compensation (Section 6);
 - summarise the assessment of noise effects (Section 7);
 - summarise the sensitivity tests (Section 8);
 - provide an overall summary of the residual noise impact (harm) (Section 9);
 - f. detail how the Proposed Development complies with national policy (Section 10);
 - g. provide my response to the Reason for Refusal with regard to noise (Section 11);
 - h. provide a response to representations made by the Rule 6 party with regard to noise (Section 12); and
 - i. set out my overall conclusions (Section 13).
- 1.4.3 My evidence is supported by three appendices:
1. Sensitivity test in terms of the noise change criterion used to identify significant effects at high levels of absolute noise exposure in response to LBN's SoC and in the light of the decision (CD8.6) to grant London Luton Airport Operations Limited (LLAOL)'s section 73 application to expand London and Luton Airport operations to 19 mppa (APP/2/B/1); and
 2. A review of the Citizen Study referred to in HACAN-East's SoC at paragraph 4.2.2 (APP/2/B/2); and
 3. Copies of the figures and plans from Chapter 8 of the ES (CD1.15) that I refer to in my evidence (APP/2/B/3).

1.5 Declarations

- 1.5.1 The evidence which I have prepared and provide for this appeal reference APP/G5750/W/23/3326646 in this Proof of Evidence is true and has been prepared and is given in accordance with the guidance of my professional institution and I confirm that the opinions expressed are my true and professional opinions.

2. Reason for refusal

2.1.1 The first reason for LBN's refusal ("RfR1") relates directly to noise:

"1. The proposal, by reason of the additional morning and Saturday flights, and reduction of the existing Saturday curfew would result in a new material noise impact which would result in significant harm to the residential amenity of nearby residential properties. This would be contrary to policies D13 and T8 of The London Plan (2021) and policies SP2 and SP8 of the Newham Local Plan (2018)."

2.1.2 My evidence responds to this RfR1.

2.1.3 The second reason for LBN's refusal ("RfR2") relates indirectly to noise, in that the S106 agreement secures the enhanced Sound Insulation Scheme:

"A Deed of Variation is required in order for the s106 agreement of the parent permission to apply to this permission to secure and update the obligations necessary to make the application acceptable. In the absence of such an agreement the application would fail to secure benefits, financial contributions including mitigations related to employment, transport, air quality, sustainability and residential amenity."

Note to Applicant: This final reason for refusal could be overcome following the submission of an acceptable proposal and the completion of a S.106 legal agreement which address each of the above points."

2.1.4 The evidence of Sean Bashforth (APP/3) responds to RfR2.

3. Legislation, policy and guidance

- 3.1.1 In this section I set out the legislation, policy and guidance as relevant to noise and vibration in the context of the Appeal.
- 3.1.2 Later parts of my evidence show how the Proposed Amendments comply with policy.
- 3.1.3 The evidence of Louise Congdon (APP/1) for the Appellant addresses aviation policy, demand forecasts (upon which the noise assessment was based), economics and consumer benefits. The evidence of Sean Bashforth (APP/3) for the Appellant addresses planning policy compliance and the planning balance.

3.2 Legislation and Regulations

Environmental Noise Regulations 2006 (as amended) (“ENRs”) (CD3.7.1)

- 3.2.1 The ENRs transposed the European Noise Directive into UK legislation.
- 3.2.2 The ENRs impose the requirement for the Appellant’s five yearly cycle of noise mapping (Part2, Chapter 3 of the ENRs) and Noise Action Plan making (Part 4, Chapter 3).
- 3.2.3 It is important to note for this Appeal that the ENRs define the evening period for noise assessment (1900 to 2300) as well as daytime (0700 to 2300) and night-time (2300 to 0700) (paragraph 2(2)). These definitions apply to every day of the week including Saturday.

3.3 Noise policy

Noise Policy Statement for England (“NPSE”), 2010 (CD3.7.2)

- 3.3.1 The NPSE sets out the long-term vision and national policy on noise and has become a golden thread through government’s wider planning and aviation policy.
- 3.3.2 NPSE states at paragraph 1.7:

“Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible contribute to the improvement of health and quality of life.”*

- 3.3.3 The NPSE notes that noise is an inevitable consequence of a mature and vibrant society. (paragraph 2.1).
- 3.3.4 The NPSE notes the need to integrate consideration of the economic and social benefit of the activity under examination with proper consideration of the adverse environmental effects, including the impact of noise on health and quality of life. This is to avoid noise being treated in isolation in any particular situation, i.e., not focussing solely on the noise impact without taking into account other related factors. (Paragraph 2.18)

- 3.3.5 The NPSE notes the established concepts of NOEL (No Observed Effect Level) and LOAEL (Lowest Observed Adverse Effect Level) as applied for example by the World Health Organisation (“WHO”) and the NPSE then extends these concepts to introduce SOAEL (Significant Observed Adverse Effect Level) (paragraph 2.20).
- 3.3.6 The NPSE links LOAEL and SOAEL to the second and third aims of NPSE and sets out the actions that are required as each threshold is passed (paragraphs 2.20 to 2.25). This is set out in more detail in Planning Practice Guidance for Noise (CD3.7.7) as summarised later in my evidence.
- 3.3.7 NPSE states that it is not possible to have a single objective noise-based measure that defines a SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. (paragraph 2.22).
- 3.3.8 It is important to note that findings in relation to the LOAEL and SOAEL thresholds are measures of the effect of noise on health and quality of life, and not environmental impact assessment findings. I will explain this important distinction later in my evidence.
- 3.3.9 It is also important to note that measures applied to noise sources or between source and receiver that ‘mitigate and minimise’ the adverse effects of noise on health and quality of life will also mitigate and minimise significant adverse effects. NPSE then requires further measures to ‘avoid’ the significant adverse effects while also taking into account the guiding principles of sustainable development (paragraph 2.23).

National Planning Policy Framework (“NPPF”), 2023 (CD3.2.1)

- 3.3.10 With regard to environmental noise and new development the NPPF requires:

“174. Planning ... decisions should contribute to and enhance the natural and local environment by:

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of ... noise pollution ...”

“185. Planning ... decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life⁶⁵;” (footnote 65 in NPPF is a reference to NPSE).

- 3.3.11 With regard to paragraph 174 of the NPPF, the Planning Practice Guidance (CD3.7.7), which I summarise later in this section of my evidence, provides guidance on defining the level of noise exposure that is unacceptable for a development proposal.

3.4 National Aviation Noise Policy

Aviation Policy Framework (“APF”), 2013 (CD3.5.1)

- 3.4.1 The APF sets out the Government’s overall aviation policy in respect of noise (paragraph 3.12) as follows and notes that it is consistent with the NPSE (paragraph 3.13):

“The Government’s overall policy on aviation noise is to limit and, where possible, reduce the number of people in the UK significantly affected by aircraft noise, as part of a policy of sharing benefits of noise reduction with industry.”

- 3.4.2 The APF also provides guidance, now amended as I shall describe later, on the noise metrics to be used to rate air noise and their meaning (paragraphs 3.17 to 3.19).

- 3.4.3 The APF also sets out Government expectations for noise insulation schemes (paragraph 3.39), and assistance with the costs of moving at very high levels of exposure (paragraph 3.36). Both expectations have been amended as I shall explain.

- 3.4.4 It is relevant to note that the APF makes clear, in line with legislation³ and other policy⁴, that acoustic insulation of households and other noise sensitive buildings such as schools and hospitals, is compensatory mitigation. It should be noted that acoustic insulation is termed sound insulation the Airport and some airports and called noise insulation at other airports; this is simply a matter of semantics.

- 3.4.5 The term ‘compensatory mitigation’ is used to describe sound insulation because sound insulation is defined in Government noise policy as ‘compensation’, as just noted, and it is applied at the end of noise management hierarchies (with mitigation generally applied to the noise source first, then between the source and receiver and then lastly at the receiver). However, it is a compensation measure that provides mitigation to reduce adverse effects. The term ‘compensatory mitigation’ is therefore used in the assessment for these reasons, and to differentiate noise insulation from other measures of financial compensation such as the Airport’s Community Fund.

Consultation Response on UK Airspace Policy, 2017 (“CD3.7.8”)

- 3.4.6 The APF noise objective was clarified in 2017 by the Consultation Response on UK Airspace Policy: A framework for balanced decisions on the design and use of airspace (the “Consultation Response”) at paragraph 2.69 as follows:

“The government’s overall policy on aviation noise is to limit and, where possible, reduce the number of people in the UK significantly affected by aircraft noise as part of a policy of sharing benefits of noise reduction with industry in support of sustainable development.”

“Consistent with the Noise Policy Statement for England, our objectives in implementing this policy are to limit and, where possible, reduce the number of people in the UK significantly affected by the adverse impacts from aircraft noise.”

³ E.g. Land Compensation Act, 1974

⁴ E.g. Airports NPS, 2018 (CD3.5.2)

3.4.7 The Government confirmed that the Consultation Response should be considered current government policy (paragraph 9 of the introduction):

“The Government’s current aviation policy is set out in the Aviation Policy Framework (APF). The policies set out within this document provide an update to some of the policies on aviation noise contained within the APF, and should be viewed as the current government policy.”

3.4.8 The Consultation Response updates the APF in a number of ways:

- a. The creation of an Independent Commission on Civil Aviation Noise (“ICCAN”) as an advisory non-departmental public body (paragraph 5 of the instruction). (Note: ICCAN was created but was wound down in September 2021 with some of the functions now taken on by the UK Civil Aviation Authority (“CAA”));
- b. The removal of the 3 dB minimum change requirement for financial assistance towards acoustic insulation to residential properties exposed to 63 dB $L_{Aeq,16hr}$ level or above as a consequence of airport development (paras 2.39, 2.41 and 2.48).
- c. Acknowledgement that a level of 54 dB $L_{Aeq,16hr}$ now corresponds to the onset of significant community annoyance and replaces the 57 dB $L_{Aeq,16hr}$ level in the APF (paragraph 2.70);
- d. Acknowledgement that some adverse effects can now be seen to occur down to 51 dB $L_{Aeq,16hr}$ and 45 dB L_{night} , so following consultation with the CAA, the Government defines LOAEL values as 51 dB $L_{Aeq,16hr}$ day and 45 dB $L_{Aeq,8hr}$ night (paragraph 2.72); and
- e. No change to government’s expectation for airports to assist with the costs of moving where expose to 69 dB $L_{Aeq,16hr}$ or more but with a new requirement of an offer of full insulation to be paid for by the airport where the homeowners do not want to move (paragraphs 2.39, 2.40 and 2.48).

Air Navigation Guidance (“ANG”), 2017 (CD3.5.9)

3.4.9 The Government also provided guidance on the implementation of aviation noise policy (as clarified by the Consultation Response) in its ANG (paragraphs 3.4 to 3.12). The guidance may be summarised as:

- a. The definition of the national aviation noise objective is “to limit and, where possible, reduce the number of people in the UK significantly affected by adverse impacts from aircraft noise”.
- b. The Government wishes the CAA to interpret this objective to mean that the ‘total adverse effects’ on people as a result of aviation noise should be limited and, where possible, reduced, rather than the objective relating to the absolute number of people in any particular noise contour. Adverse effects are those related to health and quality of life.
- c. LOAEL values are defined as 51 dB $L_{Aeq,16hr}$ for the day and 45 dB $L_{Aeq,8hr}$ for night
- d. Altitude based priorities are set, as follows:
 - below 4,000 feet, there is a strong likelihood that aircraft could create levels of noise above the LOAEL and hence minimising the impact of noise is prioritised;
 - in the airspace at or above 4,000 feet to below 7,000 feet, the environmental priority should continue to be minimising the impact of aviation noise in a manner consistent with the Government’s overall policy on aviation noise, unless the CAA is satisfied that the evidence presented by the sponsor demonstrates this would disproportionately increase CO2 emissions; and
 - in the airspace at or above 7,000 feet, the CAA should prioritise the reduction of aircraft CO2 emissions and minimising noise is no longer the priority.
- e. For communities further away from airports that will not be affected by noise above the LOAELs identified above, it is important that other aspects of noise are also taken into

account where the total adverse effects of noise on people between different options are similar. Metrics that must be considered for these purposes in terms of airspace change proposals include the overall number of overflight and number above metrics: N65 for daytime noise and N60 for night-time noise.

- 3.4.10 Whilst these paragraphs are specific to airspace change, the guidance as a whole also applies to noise management in general (as noted in the document subtitle [emphasis added]: “*Guidance to the CAA on its environmental objectives when carrying out its air navigation functions, and to the CAA and wider industry on airspace and noise management*”) and is in line with the Government’s 2017 clarification of aviation noise policy (as described above), which is not limited to airspace change. As a result, the guidance has been consistently adopted for airport expansion applications and decisions (e.g. Bristol Airport (CD8.1) and Luton Airport (CD8.6)).

Airports National Planning Statement (“ANPS”), 2017 (CD3.5.2)

- 3.4.11 The ANPS at paragraph 5.68 reflects Government noise policy in the NPSE, stating that development consent should not be granted unless the Secretary of State is satisfied that the proposals meet the aims of NPSE in the context of government policy on sustainable development.

Aviation 2050: The Future of UK Aviation (“Aviation 2050”), 2018 (CD3.5.4)

- 3.4.12 In December 2018, the Government published Aviation 2050 which outlines proposals for a new aviation strategy and addresses a wide range of associated issues.
- 3.4.13 Aviation 2050 sets out at paragraph 3.122 that the Government proposes:
- “*To extend the noise insulation policy threshold beyond the current 63 dB LAeq,16hr contour to 60 dB LAeq,16hr*”.
 - “*To require all airports to review the effectiveness of existing schemes. This should include how effective the insulation is and whether other factors (such as ventilation) need to be considered, and also whether levels of contributions are affecting take-up*”;
 - “*The Government or the Independent Commission on Civil Aviation Noise (ICCAN) to issue new guidance to airports on best practice for noise insulation schemes, to improve consistency*”.
- 3.4.14 ICCAN published its review of airport noise insulation schemes in 2021.
- 3.4.15 Aviation 2050 specifically addresses the World Health Organisation’s (WHO) 2018 Environmental Noise Guidelines (CD3.6.9). It notes at paragraph 3.106 that “*The government is considering the recent new environmental noise guidelines for the European region published by the World Health Organisation (WHO). It agrees with the ambition to reduce noise and to minimise adverse health effects, but it wants policy to be underpinned by the most robust evidence on these effects, including the total cost of action and recent UK specific evidence which the WHO report did not assess.*” Further information has been published by the CAA in 2022 via an update to CAP 1506 (CD3.7.4) and CAP 2161 (CD3.7.5), which I summarise in the guidance section of my evidence.

Flightpath to the Future (“FtF”), 2022 (CD3.5.6)

- 3.4.16 Following the pandemic the Government advised with respect to the Aviation 2050 consultation (CD3.5.4) that:

“given the unprecedented challenges that the aviation sector has faced as a result of the coronavirus (COVID-19) pandemic, we have decided we will not publish a further formal response to the remaining parts of this consultation.”.

- 3.4.17 Instead, in May 2022, the Government published FtF (CD3.5.6), a strategic framework that builds on the responses received to the Aviation 2050 consultation.

- 3.4.18 FtF contains a ten-point plan for the future of UK aviation (pages 9 to 11). Point 4 provides that the Government will *“continue to work with the sector to reduce the localised impacts of aviation from noise and air pollution”*. FtF also 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. It states at page 35 that *“This will include collaboration on the CAA’s plans to create a new Sustainability Panel, designed to provide independent expert advice on a range of environmental issues including carbon, noise and air quality.”*

- 3.4.19 FtF also states at page 35 that:

“the Government set out new policy proposals to tackle these localised impacts through the Aviation 2050 consultation (2018). These included a clearer noise policy framework alongside measures to incentivise best operational practice to reduce noise and measures to improve airport noise insulation schemes. As the sector recovers, and air travel volumes increase again, these aims remain very relevant and we will set out next steps in 2022/23”.

Overarching Aviation Noise Policy Statement (“OANPS”, 2023 (CD3.7.3)

- 3.4.20 Following the aspirations set out in FtF, the Government published the OANPS which confirms and clarifies the Government’s aviation noise policy, building on the APF and subsequent policy updates as noted earlier in my evidence. The OANPS states at its third and fourth paragraphs that:

“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 practicable and realistic to do so, limiting, and where possible reducing, the total adverse impacts on health and quality of life from aviation noise.”

- 3.4.21 The OANPS highlights that the economic and consumer benefits may counterbalance any increase in the adverse effects of noise, stating at its eighth paragraph that:

“an overall reduction in total adverse effects is desirable, but in the context of sustainable growth an increase in total adverse effects may be offset by an increase in economic and consumer benefits.”

- 3.4.22 This is a clarification and confirmation that the Government’s policy since the APF (CD3.5.1) has been in the context of a balance between the economic benefits and other implications, as noted in the APF at paragraph 1.91:

“Where a planning application is made that is likely to have an impact on an existing aerodrome’s operations, the economic benefit of the aerodrome and its value to the overall aerodrome network as well the economic benefits of the development will be considered as part of the application process. However, these benefits will be balanced against all other considerations.”

- 3.4.23 The OANPS is linked to the NPSE (CD3.7.2) (eighth paragraph):

“In circumstances where there is an increase in total adverse effects, “limit” would mean to mitigate and minimise adverse effects, in line with the Noise Policy Statement for England.”

- 3.4.24 As I have already noted the three aims of Government noise policy as defined in the NPSE (paragraph 1.7) are to be understood explicitly in the context of sustainable development.

- 3.4.25 The OANPS, in line with historic aviation policy and current noise policy (the NPSE), makes clear that whilst an overall reduction in total adverse effects from aviation noise is desirable, noise must be considered in the context of sustainable development policy and hence must be balanced with the economic and consumer benefits of aviation. Further, this balance should take into account the local and national context of both passenger and freight operations and recognise the additional health impacts of night flights.

3.5 National policy on noise curfews and respite

- 3.5.1 As I note in Section 2 of my evidence, LBN’s RfR1 relates to the proposed “*reduction of the existing Saturday curfew*”.

- 3.5.2 This reason for refusal was informed by a paper produced by Mr Thornley-Taylor and submitted to the LPA on 3 April 2023 (CD4.5.8). The paper, entitled Noise Review of London City Airport Planning Application, considered the noise aspects of the Development Case and the supporting Environmental Statement.

- 3.5.3 In the paper, when referring to the current restriction on Saturday afternoon flights, Mr Thornley-Taylor does not use the term ‘curfew’. Instead, he uses the term ‘respite’. With regard to Saturday afternoons, he notes that in the noise assessment included in the S73 application “*reference has not been made to work which has been carried out at other airports, including Heathrow, into the value of periods of respite*”.

- 3.5.4 The terms ‘curfew’ and ‘respite’ are commonly used and are often used interchangeably, including by the Appellant and LBN and their advisors regarding the Proposed Development and noise impact with regard to the Proposed Amendments.

- 3.5.5 It should be noted, however, that aviation policy and guidance distinguish ‘curfew’ (also described in policy as a ‘ban’) and ‘respite’. As I will explain, I think that the Council is correct to use the term ‘curfew’, rather than ‘respite’, in its reason for refusal.

- 3.5.6 The APF (CD3.5.1) refers to a ‘curfew’ in the context of operating hours, distinct from ‘respite’ at paragraph 3.35 as follows:

“In recognising these higher costs upon local communities, we expect the aviation industry to make extra efforts to reduce and mitigate noise from night flights through use of best-in-class aircraft, best practice operating procedures, seeking ways to provide respite wherever possible and minimising the demand for night flights where alternatives are available. We commend voluntary approaches such as the curfew at Heathrow which ensures that early morning arrivals do not land before 4.30am.”

- 3.5.7 This makes clear that Government policy considers ‘curfews’ in the context of restricting operating hours and that this is separate to ‘respite’. This is reinforced by the Airports National Policy Statement (CD3.5.2) which also refers to expected restriction on the operating hours at Heathrow Airport (using the terminology of a ‘ban’) in the context of a development consent application for a Northwest Runway at Heathrow Airport as follows (paragraph 5.62):

“The Government also expects a ban on scheduled night flights for a period of six and a half hours, between the hours of 11pm and 7am, to be implemented.”

- 3.5.8 Turning to ‘respite’, the APF (CD3.5.1) refers to respite at paragraph 3.32 as follows:

“... in certain circumstances, such as where there is intensive use of certain routes, and following engagement with local communities, it may be appropriate to explore options for respite which share noise between communities on an equitable basis, provided this does not lead to significant numbers of people newly affected by noise.”

- 3.5.9 The Government’s Air Navigation Guidance (CD3.5.9) provides the following definitions of respite and relief at Glossary in Annex A:

“Noise Respite: The principle of noise respite is to provide planned and defined periods of perceptible noise relief to people living directly under a flight path.”

“Relief: This is when multiple routes are designed and operated far enough apart to offer a perceptible reduction in noise for communities. Respite is one form of relief, but multiple flight paths could also be operated at the same time but with an alternating pattern of operation.”

- 3.5.10 The ANPS (CD3.5.2) sets out that regarding an application for the expansion of Heathrow and its operations at paragraph 5.61:

“The applicant should put forward plans for a runway alternation scheme that provides communities affected with predictable periods of respite (though the Government acknowledges that the duration of periods of respite that currently apply will be reduced).”

- 3.5.11 The forgoing makes clear that the Government policy and guidance considers ‘respite’ in the context of different modes of airport operation, through runway or flightpath alternation.

- 3.5.12 As set out earlier in my evidence, the Government’s aviation noise policy makes clear that whilst an overall reduction in total adverse effects from aviation noise is desirable, noise must be considered in the context of sustainable development policy and hence must be balanced with the economic and consumer benefits of aviation. In this policy context, the policy distinction between ‘curfew’ and ‘respite’ is important in that:

- a. ‘Curfew’: means a ban on scheduled aircraft movements during certain hours of the day or night; and

- b. ‘Respite’; means continued scheduled aircraft movements during the relevant hours, but with the respite being provided by alternation between airport operation modes or different flight paths.

- 3.5.13 In each case, however, there is a balancing of the economic and social benefits of movements during certain hours of the day or night with the benefits to noise receptors of the curfew or respite during those hours. Importantly, given that a curfew entails an almost complete loss of socio-economic and consumer benefits from flights during the curfew hours, this heavily weighs the balance against curfews as a cost-effective noise mitigation.
- 3.5.14 The evidence of Louise Congdon (APP/1) and Sean Bashforth (APP/2) consider socio-economic and consumer benefits and the balance between these and noise effects arising from the Proposed Amendments.

3.6 Development Plan policy

- 3.6.1 Development Plan policy includes that set regionally by the Greater London Authority (“GLA”) in The London Plan (CD3.3.1) and that set locally by the London Borough of Newham LBN, in its Local Plan (CD3.4.1).
- 3.6.2 In RfR1, LBN asserts that the Proposed Amendments would be contrary to policies D13 and T8 of The London Plan (2021) (CD3.3.1). Regarding noise, these two policies state:

Policy D13 (agent of change), [emphasis added]:

“C New noise and other nuisance-generating development proposed close to residential and other noise-sensitive uses should put in place measures to mitigate and manage any noise impacts for neighbouring residents and businesses.”

Policy T8 ‘Aviation’, [emphasis added]:

“B The environmental and health impacts of aviation must be fully acknowledged and aviation-related development proposals should include mitigation measures that fully meet their external and environmental costs, particularly in respect of noise, air quality and climate change. Any airport expansion scheme must be appropriately assessed and if required demonstrate that there is an overriding public interest or no suitable alternative solution with fewer environmental impacts.”

“E Development proposals that would lead to changes in airport operations or air traffic movements must take full account of their environmental impacts and the views of affected communities. Any changes to London’s airspace must treat London’s major airports equitably when airspace is allocated.”

- 3.6.3 In RfR1, LBN asserts that the Proposed Amendments would be contrary to policies SP2 and SP8 of the Newham Local Plan (2018) (CD3.4.1). Regarding noise, these two policies state:

SP2 ‘Healthy Neighbourhoods’, [emphasis added]:

“Development proposals which address the following strategic principles and spatial strategy, and technical criteria will be supported:

1. Strategic Principles and Spatial Strategy:

iii. The need to improve employment levels and reduce poverty, whilst attending to the environmental impacts of economic development including community/ public safety, noise, vibrations and odour and the legacy of contaminated land as per SP8 ...”

SP8 ‘Ensuring Neighbourly Development’, [emphasis added]:

“Proposals that address the following Strategic Principles, Spatial Strategy and Design, Management and Technical criteria will be supported:

1. Strategic principles and Spatial Strategy

a. All development is expected to achieve good neighbourliness and fairness from the outset by avoiding negative and maximising positive social, environmental and design impacts for neighbours on and off the site;”

3.7 Guidance

Planning Practice Guidance – Noise (“PPG-N”) (CD3.7.7)

- 3.7.1 With regards to aviation noise, PPG-N notes that where airport expansion is considered through the planning system, it will be important for decisions to consider any additional or new impacts from that expansion, and not to revisit the underlying principle of aviation use where it is established (paragraph 014).
- 3.7.2 The PPG-N (paragraph 005) sets out how can it be established whether noise is likely to be a concern and in so doing summarises the noise exposure hierarchy, based on the likely average response of those affected. I have reproduced the hierarchy at Table 3.1.
- 3.7.3 The hierarchy is in terms of the NOEL, LOAEL and SOAEL threshold concepts set out in the NPSE. PPG-N adds the definition of an Unacceptable Adverse Effect and the threshold for identifying such an effect is often described as the Unacceptable Adverse Effect Level (UAEL).
- 3.7.4 Between NOEL and LOAEL, the hierarchy advises that noise “is present and not intrusive” and “no specific measures are required”.
- 3.7.5 Between LOAEL and SOAEL, the hierarchy states that noise is “intrusive” and the action is to “mitigate and minimise to a minimum” (in line with the OANPS and the second aim of NPSE). Regarding mitigation for airport expansion, PPG-N advises at paragraph 013 “*It may be appropriate to consider, as part of any proposed mitigation strategy, how operational measures, siting and design of new taxiways, apron and runways, and ground-level noise attenuation measures could reduce noise impacts of expansion or increased utilisation to a minimum.*”. PPG-N reminds the reader at paragraph 5 that when considering ‘mitigating and minimising’ this shall take account of the economic and social benefits being derived from the activity causing the noise.

Table 3.1: Noise exposure hierarchy from PPG-N

Response	Examples of outcomes	Increasing effect level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

- 3.7.6 Between SOAEL and UAEL, the hierarchy states that noise is “*disruptive*” and the action is to “*avoid*”. Mitigation at source to minimise adverse effects between LOAEL and SOAEL will also minimise significant adverse effects above SOAEL. Noting, as PPG-N does, that above SOAEL people will keep windows closed for most of the time, the precedent⁵ for the further action to be taken above SOAEL is for full noise insulation to be offered as compensatory mitigation. Such insulation is specified to protect good living conditions inside homes and hence ‘avoid’ the residual significant adverse effect on health and quality of life that would otherwise arise. PPG-N at paragraph 5 states that whilst decisions about exposure above SOAEL must be made taking account of the economic and social benefit of the activity causing or affected by the noise, it is undesirable for such exposure to be caused.
- 3.7.7 At the highest levels of exposure at or above UAEL, the effect is such that PPG-N and its hierarchy require that such exposure is ‘prevented’ regardless of the benefits of the activity causing the noise. If required, precedent for actions at such exposure include rehousing residential receptors.

CAA guidance

- 3.7.8 With regard to aircraft noise annoyance and health impacts, the CAA published updated information in 2021 and 2022:
- CAP 1506 Survey of Noise Attitudes 2014: Aircraft Noise and Annoyance (“SoNA”), Second Edition (Ref. 10) (CD3.7.4);
 - CAP 2161 Survey of Noise Attitudes 2014: Aircraft Noise and Sleep Disturbance (Ref. 11) (CD3.7.5); and
 - CAP 2251 Survey of Noise Attitudes 2014: Aircraft Noise and Sleep Disturbance, Further Analysis (CD3.7.30)
- 3.7.9 These reports present guidance on the relationship between different noise indicators and annoyance and health effects.
- 3.7.10 SoNA includes the results of a survey to noise attitudes to civil aircraft. SoNA largely replaces the earlier report ‘Attitudes to noise from aviation sources in England’ (ANASE), which was the last large scale survey on attitudes to aircraft noise published in 2007.
- 3.7.11 SoNA is based on the social surveys undertaken around Heathrow, Gatwick and Stansted. The survey methodology, that was independently reviewed, includes gathering survey information on weekends as well as weekdays and enabled respondents to report when they were most bothered over different time periods Monday to Friday, Saturday and Sunday. Surveys at Heathrow were at times when exposure included the longstanding and continuing ban on easterly departures from the north runway (the Cranford Agreement⁶), the voluntary ban on scheduled night-flight flights (to 0600 for departures and to 0430 for long haul arrivals), and also predictable ‘respite’ for communities east of the Airport through alternation between arrival runways when the Airport is in ‘westerly’ mode of operation.

⁵ E.g. s73 approval to end the Cranford Agreement at Heathrow airport (CD8.5) as well as Thames Tideway DCO, highways DCOs since A14 Cambridge to Huntingdon and HS2 Phases one and 2a..

⁶ Aircraft were banned from taking off in an easterly direction on the northern of the two Heathrow runways over the community of Cranford. Aircraft were not banned from landing over Cranford. This arose from a Ministerial commitment given in 1952 that was observed by the airport operator. The Government subsequently announced in 2009 that the agreement should end. The Cranford planning permission (CD8.5) was for some adjustments to the runway entries to allow easterly take offs on the northern runway. In the event, this has not yet been put into effect through Heathrow has a single runway, night alternation pattern that includes northern runway departures over Cranford.

- 3.7.12 SoNA compared reported mean annoyance scores against average summer-day noise exposure defined using the following noise indicators: $L_{Aeq,16hr}$, L_{den} , N70 and N65. The Mean annoyance score correlated well with the average summer day noise exposure, $L_{Aeq,16hr}$. No evidence was found to suggest any of the other indicators correlated better with annoyance than $L_{Aeq,16hr}$. It should be noted that ‘Summer’ in this context refers to the 92-day period from 16th June to 15th September.
- 3.7.13 As already noted in my evidence, SoNA resulted in the 54 dB $L_{Aeq,16hr}$ becoming the threshold of significant community annoyance rather than 57 dB $L_{Aeq,16hr}$, which was based on the UK Aircraft Noise Index Study from 1985.
- 3.7.14 SoNA concludes that the summer average $L_{Aeq,16hr}$ is still the most appropriate indicator to use to estimate the annoyance arising from aircraft noise (paragraph 8.8).
- 3.7.15 Having said that, SoNA recognises that residents can struggle to understand the concept of a time-averaged metric such as $L_{Aeq,16hr}$ and L_{den} and the fact that it is measured and reported on a logarithmic scale where a change of 3 dB represents a doubling or halving of noise energy (paragraph 8.9).
- 3.7.16 SoNA recognises, therefore, that there is merit in considering greater use of ‘Number Above’ metrics as supplemental indicators to help portray noise exposure but recognising that evidence-based decisions should continue to use $L_{Aeq,16hr}$ [paragraph 8.10].
- 3.7.17 CAP 2161 concludes that $L_{Aeq,8hr}$ is the appropriate indicator to use to estimate self-reported sleep disturbance arising from aircraft noise (paragraph 8.9).
- 3.7.18 The study for CAP 2161 compared reported mean night-time disturbance scores against average night noise exposure defined using three different noise indicators: average summer night $L_{Aeq,8hr}$, annual average night L_{night} , and average summer night N60 (paragraph 8.10).
- 3.7.19 All three noise indicators are highly correlated with night-time self-reported sleep disturbance ($r^2=0.822-0.883$). The r^2 for L_{night} (0.842) was slightly lower than for $L_{Aeq,8hr}$ (0.883). It is plausible that L_{night} is inferior to $L_{Aeq,8hr}$ as both Gatwick and Stansted airports experience significant seasonality with greater numbers of night flights during the summer months. N60 is found to correlate almost as well as $L_{Aeq,8hr}$ and L_{night} . Based on this exploratory analysis, CAP 2161 notes that there is insufficient evidence to change from the current practice of using average summer night $L_{Aeq,8hr}$ noise exposure for UK assessments (paragraph 8.11).
- 3.7.20 The study for CAP 2251 (CD3.7.30) was initiated because, despite the findings of CAP 2261, many stakeholders argue that an average night noise dose is inappropriate for comparing against attitudes to sleep disturbance and effects on sleep, since an average night dose does not include information on the noise level of each individual event.
- 3.7.21 CAP 2251 concludes that the analysis found that the $L_{Aeq,8hr}$ does correlate with the number of additional aircraft noise-induced awakenings arising from individual aircraft events at night and the self-reported sleep disturbance results found in the SoNA 2014 survey. Consequently, the concerns that are expressed that averaging the night-time noise exposure do not properly reflect the impact of individual aircraft noise events may be unfounded.

Professional Practice Guidance on Planning & Noise (“ProPG”), 2017 (CD3.7.21)

- 3.7.22 The preparation of the ProPG was overseen by a Working Group consisting of representatives of the Association of Noise Consultants (“ANC”), Institute of Acoustics (“IOA”) and Chartered Institute of Environmental Health (“CIEH”), together with practitioners from a planning and local authority background. The project was jointly supported by the ANC, IOA and CIEH. I was part of the Working Group.
- 3.7.23 The ProPG was produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England.
- 3.7.24 The NPPF (CD3.2.1) encourages improved standards of design. The CIEH, IOA and the ANC worked together to produce the guidance which encourages better acoustic design for new residential development and aims to protect people from the harmful effects of noise.

Other Guidance

- 3.7.25 In this section I will headline other guidance that is relevant to the appeal.
- 3.7.26 With regard to good practice guidance, the noise assessment included as part of the ES followed:
- The IEMA Guidelines (CD3.7.22) on Environmental Noise Impact Assessment. These guidelines also provide guidance on significance rating for a change in air noise levels.
 - The Design Manual for Roads and Bridges (DMRB) from which LA111 (CD3.7.23) provides road traffic noise assessment.
 - BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites that provides methods to predict, measure and assess the impact of construction and demolition noise.
- 3.7.27 The WHO provided the following guidance that has been taken into account by Government in setting out its noise policy (NPSE) and aviation noise policy (APF as amended and ANG):
- Guidelines for Community Noise, 1999 (CD3.7.12) that set out noise targets which represent goals for minimising the adverse effects of noise on health; and
 - Night Noise Guidelines for Europe, 2009 (CD3.7.11) that provide guidance on effects on health and sleep from transportation sources.
- 3.7.28 As noted earlier in my evidence, in 2018 the WHO published Environmental Noise Guidelines for the European Region: A Systematic Review on Environmental Noise and Effects on Sleep (CD3.7.6). While this reports the latest findings from the WHO concerning noise health and wellbeing effects from transportation sources, it does not use concepts such as LOAEL. Further, the Government set out in Aviation 2050 (CD3.5.4) that whilst it agrees with the ambition to reduce noise and to minimise adverse health effects, it wants policy to be underpinned by the most robust evidence on these effects, including the total cost of action and recent UK specific evidence which the WHO report did not assess. On this, I note and give weight to the updated information that was published by the CAA in 2021 in the update to SoNA (CD3.7.4) and the new CAP 2161 (CD3.7.5), which I have already summarised in my evidence.
- 3.7.29 With regard to noise levels inside noise sensitive buildings, the ES noise assessment (CD1,15) of the Development Case had due regard to:
- BS8233:2014 Sound insulation and noise reduction for buildings – Code of practice (CD3.7.24) that provides guidance on good and reasonable indoor noise levels for different types of space.

- b. Department of Education BB93 (CD3.7.25) that gives upper limits for indoor ambient noise level for new and refurbished schools, and schools formed by a material change of use.
- c. Department of Health HTM 08-1 (CD3.7.26) that provides guidance on recommended internal noise levels for healthcare facilities.

3.7.30 The percentage of those people likely to be highly sleep disturbed by aircraft noise as reported in the ES noise assessment was informed by Defra's Environmental Noise: Valuing impacts on: sleep disturbance, annoyance, hypertension, productivity and quiet (CD3.7.27).

4. Consultation

- 4.1.1 In addition to continuous and ongoing engagement with LBN and other statutory consultees, the Appellant held a ten-week, non-statutory, public consultation in developing the Proposed Amendments. The consultation included public exhibitions, pop-up events, a dedicated website and virtual exhibition. Information was provided through exhibition boards and an Initial Environmental Report. Engagement and consultation activity is summarised in the Statement of Community Involvement (CD1.6).
- 4.1.2 The feedback was mixed with positive comments received from industry stakeholders, passengers, and local businesses. Neutral or mixed feedback was voiced by some members of the public, elected representatives and political stakeholders on issues such as Saturday hours and noise. Further details of the public consultation and the responses are contained in the Statement of Community Involvement (SCI) which accompanied the S73 application.
- 4.1.3 The feedback received from all stakeholders was taken into account in preparing the S73 Application and the proposals consulted on were revised. These changes comprised a reduction in the extended hours sought on a Saturday, a reduction in the number of additional movements sought in the early morning period, and no longer seeking to change the cap on the number of movements that have experienced unavoidable operational delays and so can operate in the last 30 minutes of the operational day (e.g. 2200 to 2230 week days).
- 4.1.4 Prior to submission of the S73 Application an Initial Environmental Report (CD1.25) was prepared as part of the non-statutory public consultation. A draft Scoping Report (CD1.26) was also prepared which formed part of the pre-application engagement between the Appellant and LBN. The Scoping Report detailed the approach to the noise assessment including the use of the $L_{Aeq,16hr}$ index as the standard noise indicator, evaluation criteria, the study area (within the LOAEL contours, day and night, for each noise source), the assessment years, how the noise contours would be prepared and at what values. This included the use of dedicated contours for the weekend period and contours for the night-time period. In addition, details were given on how significance was to be determined using both absolute noise levels and any changes in noise level.
- 4.1.5 It is of note that the noise related matters of uncommon ground noted in the SoCG with LBN (CD11.2) were not matters raised by LBN when it considered the EIA Scoping Report.

5. Assessment methodology

5.1 Introduction

- 5.1.1 In this part of my evidence, I summarise the methodology adopted for the noise assessment presented in Chapter 8 of the ES (CD1.15).

5.2 Noise sources

- 5.2.1 Chapter 8 of the ES considered the potential impacts and likely significant effects associated with the following types of noise: construction noise; construction and operational road traffic noise; operational air noise; and operational ground noise.
- 5.2.2 The assessment of construction and operational vibration was scoped out of the assessment on the basis that there are not considered to be any likely significant effects.
- 5.2.3 Air noise is that produced by aircraft during departure and arrival at the Airport. It includes noise generated from the 'start of roll' on departure and up to reversed thrust, if required, on arrival.
- 5.2.4 Air noise does not include the aircraft taxiing between the aircraft stands and the runway, which is captured under ground noise. Ground noise encompasses that produced by aircraft activities on the ground, such as during taxiing, manoeuvring, holding on the runway prior to departure, running engines on the stand and operation of auxiliary power units (APUs) while on stands. Noise from engine running for test and maintenance purposes is also considered as ground noise.
- 5.2.5 Road traffic noise includes noise from road vehicles accessing the Airport, including vehicles related to the construction activity, as well as that from other road vehicles, not related to the Airport, using the surrounding roads. Due to the overlap between the construction and operation phases, construction and operational traffic is considered together and the noise impact of total traffic flows is considered.
- 5.2.6 As the areas of difference with LBN and RfR1 are primarily with regard to air noise and ground noise, I have focused on these topics in my evidence with further specific information on other noise and vibration sources where needed.

5.3 Noise sensitive receptors

Air noise

- 5.3.1 Population and dwelling data for the air noise assessment was provided by CACI Ltd in the form of a 2022 postcode database.
- 5.3.2 In addition, the air noise assessment considered permitted developments with the study area. These are residential developments with planning permission which have not yet been built or are only partially built at the time of this assessment. The permitted development locations relevant to noise are shown in Figure 8.3.2 in Appendix 8.3 of the ES (CD1.39), reproduced in Appendix 2 of this proof (APP/2/B/2).

- 5.3.3 The air noise assessment has also considered the effects on non-residential noise sensitive receptors within the study area. Data was provided by the planning consultant for the existing receptors. Three types of receptors have been considered:
- Schools including formal nurseries but excluding informal settings such as day care;
 - Long term healthcare facilities, such as hospitals and nursing homes, but excluding pharmacies, GP surgeries, etc.; and
 - Outdoor amenity areas, such as official parks and playgrounds, but excluding areas not open to the public and areas of a minimal extent such as road side verges.
- 5.3.4 There are currently 129 schools, 4 residential healthcare buildings and 287 outdoor amenity areas within the air noise study area, shown in Figure 8.3.3 of the ES. A full list of these receptors is given in Appendix 8.3 and their locations are shown in Figure 8.3.3 of the ES, reproduced in Appendix 2 of this proof (APP/2/B/3). No permitted, but not built, non-residential noise sensitive receptors within the study area have been identified.
- 5.3.5 Noise levels were presented for 12 locations representative of the areas around the Airport. The locations are not themselves noise sensitive, as the assessment is based on the population data, but are presented to allow individuals to understand the noise levels in their area and how it is forecast to change. These representative locations are listed below and are shown in Figure 8.3.1 of the ES, reproduced in Appendix 2 of this proof (APP/2/B/3).
- 5.3.6 The Air Noise Representative Locations are:
1. Blackwall / A1261
 2. Britannia Village
 3. Silvertown / A1020
 4. Custom House
 5. Camel Road
 6. Royal Albert Dock (north)
 7. North Woolwich (north)
 8. Thamesmead
 9. Eastern Quay Apts, Britannia Village
 10. Coral Apts, Western Gateway
 11. Silvertown Quays
 12. Ramada Hotel

Ground noise

- 5.3.7 The ground noise assessment considers 10 representative locations. These representative locations are shown in Figure 8.4.1 in Appendix 8.4 (CD1.40), reproduced in Appendix 3 of this proof (APP/2/B/3), and are listed below:
1. Drew Road
 2. North Side of Royal Albert Dock
 3. Camel Road Flats
 4. Parker Street
 5. Newland Street
 6. Storey Road School
 7. Great Eastern Quays / “Norton Pharmaceutical”
 8. University of East London
 9. Royal Docks Business
 10. Brixham Street
- 5.3.8 In addition, a set of 3,673 receptor locations representative of the current dwellings around the Airport have been assessed.

5.4 Assessment scenarios

- 5.4.1 Air traffic at the Airport was severely impacted by the Covid-19 pandemic throughout 2020 and 2021. Noise data for 2019 was therefore used to represent the baseline for the noise assessment.
- 5.4.2 For air noise, ground noise and road traffic noise the following assessment years and scenarios were considered in Section 8.6 of Chapter 8 of the ES (CD1.15):
- 2019 Baseline;
 - 2025, for both the Do-Minimum (“DM”) and with Development Case (“DC”) scenarios;
 - 2027, for both the DM and DC scenarios; and
 - 2031, for both the DM and DC scenarios.
- 5.4.3 In addition to these core assessment years and scenarios, a sensitivity test based on reaching the proposed passenger cap of 9 mppa slightly earlier in 2029 or later in 2033 was quantitatively assessed for air noise. These ‘Faster Growth’ and ‘Slower Growth’ Cases are described in detail in Chapters 2 and 3 of the ES (CD1.9 and CD1.10).and result in slight differences in the forecast mix of aircraft and the proportion of quieter new generation aircraft. As the eventual number of aircraft movements and passenger numbers are the same in these sensitivity tests as the core Scenario (111,000 ATMs and 9 mppa respectively), it was not considered necessary to consider ground noise or road traffic noise for these scenarios.
- 5.4.4 Further sensitivity tests in the ES, consider the number of early morning movements being at the proposed limit every day, and an alternative fleet mix of future aircraft types. I summarise the results of the sensitivity tests later in my evidence.

Sensitivity test - Proposed Early Morning Limit

- 5.4.5 The Proposed Early Morning Limit sensitivity test is presented in paragraphs 8.6.295 – 8.6.311 of Chapter 8 of the ES. Further information is provided in Appendix 8.3 of the ES (CD1.39).
- 5.4.6 The core scenario assessments are based on the expected number of flights in the early morning period (0630-0659) over the 92-day summer period based on the permitted limit of up to 6 flights per day and the proposed limit of up to 9 flights per day respectively, excluding Sunday morning when the Airport is closed. Although the Airport is allowed to operate a maximum of six flights per day, over the summer period the average per day is historically less than this limit, for example in 2019 there were 361 flights in the early morning period, although the current limit equated to 468 over the summer period.
- 5.4.7 The Proposed Early Morning Limit sensitivity test therefore assessed the noise effects in the event that the Airport was to operate the maximum of 9 movements every early morning throughout the 92-day summer period (excluding Sundays).

Sensitivity test - Alternative fleet mix

- 5.4.8 The Alternative Fleet Mix sensitivity test is presented in paragraphs 8.6.312 – 8.6.320 of Chapter 8 of the ES(CD1.15). Further information is provided in Appendix 8.3 of the ES (CD1.39).
- 5.4.9 The Core Development Case assessments consider the most likely future aircraft fleet. The Airport has committed to only allowing quieter new generation aircraft to operate in the extended weekend operating hours. There are a number of quieter new generation aircraft currently available that could operate at the Airport but are not currently forecast to do so. One

of these, the Airbus A220-300, is quieter than existing types but is noisier than other new generation types.

- 5.4.10 To consider whether the use of this aircraft type could materially affect the weekend noise assessment, the Alternative Fleet Mix Scenario was quantitatively assessed for air noise.

5.5 Noise monitoring

- 5.5.1 Noise monitoring was undertaken for the CADP1 application in 2011, 2012 and 2015. Further noise monitoring was undertaken in 2019 at similar locations to obtain more up to date ambient and background noise levels for locations representative of the areas around the Airport. Supplementary surveys were undertaken in 2022 to specifically measure weekend noise levels. Details of the noise survey work is provided in Appendix 8.2 of the ES (CD1.38).
- 5.5.2 In addition, long term noise monitoring data is available from the Airport's six fixed noise monitoring terminals (NMTs). These NMTs are part of the Noise and Flight Track Monitoring System (NFTMS) at the Airport and continuously record. They are primarily used to identify aircraft events which are correlated with radar information. $L_{Aeq,T}$ and L_{A90} noise levels at these six locations are presented for 2019 for the daytime, night-time and weekend daytime periods in the ES.

5.6 Assessment - general approach

- 5.6.1 The generic project-wide approach to the assessment methodology is set out in Chapter 3: EIA Methodology (CD1.10). However, whilst this has informed the approach that was been used in this noise assessment, it is helpful to set out how this methodology has been applied, and adapted as appropriate, to address the specific needs of the noise assessment.
- 5.6.2 While the technical assessment methodology adopted for a given source of noise is specific to that source and its relevant guidance (I shall return to air and ground noise methodologies), there are some common concepts that apply across all noise topics based on Government guidance.
- 5.6.3 Through the NPSE and the introduction of the SOAEL, the Government has introduced the concept of significance thresholds related to health effects and quality of life. It is important to note that "significance" in this context differs from that used in an ES. This has been clear since the Examining Authority's report and Secretary of State's decision in relation to the Thames Tideway Tunnel DCO in 2014. This difference reflects the fact that the SOAEL threshold refers to the significance of the absolute noise level, whereas an ES assesses the significance of changes brought about by any proposed development. For example, a receptor may be exposed to significant levels of noise regardless of any development, but if the noise level remains the same then the receptor would not be said to be significantly impacted by the proposed development.
- 5.6.4 The thresholds for assessing health effects and quality of life are important, particularly when considering and comparing different scenarios as well as establishing the need for and extent of noise mitigation. As I have already noted, the NPSE introduces the concept of the NOEL, LOAEL and SOAEL and as already note PPGN- also introduces the concept of the UAEL.
- 5.6.5 NOEL, LOAEL, SOAEL and UAEL values are not defined by policy or PPG-N; with the exception of air noise LOAEL values that are defined by aviation policy as noted earlier in my proof. LOAEL, SOAEL and UAEL values need to be defined and can vary depending on the source, receptor, and time period (e.g. day or night). In this way the sensitivity of the receptor is

embedded into the criteria. For example, the SOAEL for a dwelling at night will be lower than during the day, to reflect the fact that residents are more sensitive to noise at night.

- 5.6.6 Policy, technical guidance and precedence have been used to define LOAEL, SOAEL and UAEL for each noise source as described in detail in Appendix 8.1 of the ES (CD1.37). I will return to the air and ground noise assessment criteria in later sub-sections of my evidence.
- 5.6.7 Where any adverse noise effects are predicted, the ES reports the embedded and enhanced noise mitigation resulting from the extant planning requirements, the Airport's Noise Action Plan (CD5.4) and the Proposed Development that minimise these effects and avoid significant effects on health and quality of life. This approach is considered consistent with the principal aims of the NPSE. It is important to note that findings against the LOAEL and SOAEL are measures of the effect of noise on health and quality of life, and not environmental impact assessment findings.
- 5.6.8 The WHO published their updated Environmental Noise Guidelines (CD3.6.9) which summarise international research on the effects of noise. This can be useful for quantifying noise effects. The WHO review of the research assessed the quality of the evidence it provided and proposed guidelines in certain circumstances. They consider this public health advice essential to drive policy action. The guidelines are not policies themselves, although they can be of assistance in supporting policy.
- 5.6.9 With regard to aircraft noise the guidelines recommend that noise does not exceed 45 dB L_{den} or 40 dB L_{night} outside a dwelling. These are very low recommended levels and are aspirational targets that have not been adopted as policy in the UK. As a result, this assessment still relies on previous advice from the WHO as relevant, as this has informed the Government policy that applies today.
- 5.6.10 For context, the WHO Guidelines also give recommendations for other noise sources including road traffic. The 2017 reporting for the Greater London Urban Area agglomeration shows almost 2,650,000 people in the urban area are exposed to average day-evening-night noise levels (L_{den}) of at least 55 dB from road traffic, which is above the WHO recommended level.

5.7 Noise indices

General

- 5.7.1 The noise assessment utilises a range of primary and supplementary indices to predict future noise levels and the associated effects.
- 5.7.2 The L_{Aeq,T} index is the equivalent noise exposure level that occurs over a time period *T*. In the case of aircraft noise, it accounts for the sound energy produced both by the number of aircraft events and the noisiness of each aircraft event, over a defined time period. It is the primary indicator for quantifying community effects of most noise sources in the UK, including aircraft noise, specifically using:
- L_{Aeq,16hr} –noise exposure over the daytime period from 0700 to 2259; and
 - L_{Aeq,8hr} - noise exposure over the night-time period from 2300 to 0659.
- 5.7.3 For aviation noise, the convention for these indicators is to assess aircraft movements over three summer months, specifically a 92-day period from 16th June to 15th September inclusive. The term “summer” in my evidence refers to this 92-day period unless stated otherwise.

- 5.7.4 The Government, as set out in the APF (CD3.5.1) and updates to it and supported by SoNA (CD3.7.4), confirms that daytime aircraft noise should be assessed using daytime $L_{Aeq,16hr}$ noise contours determined from an average summer day of aircraft movements. This indicator has been used historically within the UK over the past 30 years to assess the effects of aircraft noise and there is a body of research considering the response of and effects on people from aircraft L_{Aeq} noise levels. As I have already noted, in 2021 the CAA re-confirmed that the $L_{Aeq,16hr}$ remains the best indicator of community annoyance to aircraft noise. As a result, emphasis on the assessment of daytime noise in chapter 8 of the ES and in my evidence is placed on the UK methodology and $L_{Aeq,16hr}$ indicator.
- 5.7.5 The SoNA (CD3.7.4) also notes that the $L_{Aeq,16hr}$ indicator can be difficult for communities to understand and hence there is merit in considering ‘Number Above’ metrics as supplemental indicators to help portray noise exposure but recognising that evidence-based decisions should continue to use $L_{Aeq,16hr}$. I will return to supplemental indicators.
- 5.7.6 For night-time, the publication of the Government’s response to the airspace change consultation (CD3.7.8) confirms the use of $L_{Aeq,8hr}$ noise exposure contours determined from an average summer night of aircraft movements for assessing aircraft noise effects at night. In 2021 (CD3.7.5) and again in 2022 (CD3.7.30) the CAA confirmed that the $L_{Aeq,8hr}$ remains the most appropriate indicator to use to estimate self-reported sleep disturbance arising from aircraft noise (CD3.7.5). These contours are also now prepared and published annually for the designated airports such as Heathrow, Stansted, and Gatwick, along with daytime $L_{Aeq,16hr}$ contours.
- 5.7.7 L_{Aeq} contours are typically produced based on the average modal split, meaning they allow for the overall split of aircraft movements in terms of whether the Airport is operating in a westerly or easterly direction. Single mode contours can be produced assuming either 100% westerly operations or 100% easterly operations. There are no specific criteria available to rate noise levels associated with single mode contours. However, such contours show the noise exposure levels expected for a given day when operations occur from a single runway direction.
- 5.7.8 While average exposure noise contours of this type are well established and important at demonstrating trends in total noise around an airport, it is recognised in the APF and other government policy and guidance that the L_{Aeq} indicator does not necessarily reflect all aspects of the perception of aircraft noise. Supplementary indices were therefore considered as part of the air noise assessment which may help to explain how aircraft noise is experienced in different localities. The purpose of this is to ensure a better understanding of noise effects and to inform the development of targeted noise mitigation measures.
- 5.7.9 The following additional metrics have been considered:
- L_{ASmax} - reflects what a person hears as the maximum noise level during an aircraft movement and is an index that is most understandable to people without the need for technical understanding. It can be used to consider the typical noise levels of individual aircraft and rate the noise of an individual event, particularly at night. Although they can be easier for people to understand, as they relate to individual events they are not the best measurement to consider the overall situation and therefore they cannot be used as a primary assessment metric;
 - L_{den} - considers an average annual day of aircraft traffic (although it can be applied equally to either rail or road traffic) over a 24-hour period. It provides greater emphasis, by way of adding noise penalties of 5 dB and 10 dB to the noise levels for the evening (1900 to 2300) and night (2300 to 0700) periods respectively;
 - L_{night} - equates approximately to the $L_{Aeq,8hr}$ index however it is based on an average annual night of aircraft movements rather than an average summer night;
 - In Europe, noise indicators L_{den} and L_{night} are used to assess environmental noise effects and are used in the UK to prepare Strategic Noise Maps and Noise Action Plans. Noise

contours, in terms of L_{den} and L_{night} , are produced on a five-yearly basis for all major airports, including the Airport. The development of criteria by which to judge this European index is in its relative infancy compared to the body of knowledge built around the $L_{Aeq,16hr}$ and $L_{Aeq,8hr}$ units, although guidance is continuing to emerge, particularly regarding noise exposure and potential health effects.

- e. People experience aircraft noise as a series of individual events over a day. The number above (N) index (also described as Nabove or Nx) considers the number of events and is becoming more commonly used to assist in describing aircraft noise to aid public understanding:
 - N65 - number of times during the daytime that a receptor will experience a noise level of 65 dB L_{ASmax} as a result of an aircraft movement; and
 - N60 - number of times during the night-time that a receptor will experience a noise level of 60 dB L_{ASmax} as a result of an aircraft movement.

- 5.7.10 These metrics allow an understanding of how, for a given noise level and above, the number of flights during the daytime or night-time might alter when comparing two scenarios, such as with or without an airport development. There are no specific criteria for rating the acceptability of N65 or N60 contours although they further assist a comparison of two different operational scenarios.
- 5.7.11 Further information on how these supplementary indicators can be interpreted is given in Appendix 8.1 of the ES (CD1.37).
- 5.7.12 With regard to maximum noise levels the number of people exposed to individual events of at least 80 dB L_{ASmax} (approximately equivalent to 90 dB(A) SEL) at least once per night has also been determined. This threshold is commonly used and was developed based on the Report of a Field Study of Aircraft Noise and Sleep Disturbance. An interpretation of that research study's results is that there is no significant risk of sleep disturbance for locations outside the 90 dB(A) SEL footprint area. For locations within 90 dB(A) SEL footprint, a very slight risk of sleep disturbance will be present.
- 5.7.13 Noise annoyance ratings are also a useful way of explaining how a given noise environment is likely to affect the local community, by identifying those likely to be 'highly annoyed' by aircraft noise. The measure considers the general population, and it is accepted that some people would be more annoyed or less annoyed for a given daytime noise exposure level. This method of assessment offers some advantages over simply banding a population into "low", "moderate" and "high" annoyance categories since it recognises that even at relatively low levels of aircraft noise, some people can be highly annoyed. It can therefore be usefully used as a means of evaluating differences between scenarios. Similar ratings for sleep disturbance also exist for night-time activities.
- 5.7.14 The number of people likely to be highly annoyed has been calculated based on the dose response provided in SoNA (CD3.7.4). The number of people likely to be highly sleep disturbed has been calculated based on the dose response equation in the 2018 WHO Environmental Noise Guidelines (CD3.6.9) for the European Region. Further details are included in Appendix 8.3 of the ES (CD1.39). In both calculations no account is taken of any improved insulation for dwellings which have benefitted from the Airport's sound insulation scheme.
- 5.7.15 While noise exposure contours take account of both the noisiness of aircraft events and the number of operations that occur during a day or night, they only provide an overall value. While this is required by Government for planning purposes, it does not reflect the change that occurs over a day. Supplementary information can therefore be beneficial on how the noise level might vary at a given receptor across a given day, for example, on an hourly basis.

Air noise

- 5.7.16 Air noise contours and levels have been calculated using the Federal Aviation Administration (FAA) Aviation Environmental Design Tool (AEDT). Further information is provided in Appendix 8.3 of the ES (CD1.39).
- 5.7.17 For daytime air noise the standard 16 hour period assessed in the UK is 0700-2300. At the Airport, daytime noise contours have generally been produced based on the Airport's operational hours 0630-2230, thus including all flights that occur at the Airport. This approach has therefore also been used for this assessment. The 8 hour night period contours have been based on the standard UK night period 2300-0700, and thus include some movements that are also modelled in the daytime contours (i.e. those between 0630-0659).
- 5.7.18 Using this period to assess daytime noise is a conservative approach, as it allows for all the flights that occur at the Airport including those in the early morning period (0630-0659). If the standard daytime period was used (0700-2259) these early morning flights would be excluded and 30 minutes of no flights after the Airport has closed would be included; therefore using the standard daytime period for the assessment would always result in noise levels that are slightly lower than using the operational period and those reported in the ES. The difference varies very slightly by location and scenario, but in all instances 0700-2259 would be 0.1 dB quieter to 1 decimal place than 0630-2230.
- 5.7.19 The following supplementary indicators have also been provided for information, although they do not form the primary basis of the assessment of significance for air noise. They do however provide context to the significance, helping to show how the noise environment will change between one scenario and another.
- Single mode contours (L_{Aeq}), westerly and easterly;
 - Number of people likely to be highly annoyed;
 - Number of people likely to be highly sleep disturbed;
 - Day, evening, night contours (L_{den});
 - Night noise contours (L_{night});
 - N_x (Nabove) and L_{Amax} noise contours; and
 - Weekend noise (given the specific and unusual nature of the curfew on weekend operations at the Airport, see paragraph 1.3.1e).
- 5.7.20 In addition to the aircraft types currently operating at the Airport, such as the Embraer E190-E2, the forecasts include movements by new aircraft types. Consideration has therefore been given to other sources of aircraft performance data, such as those available from the CAA on the performance of future aircraft types, in particular the Embraer E195-E2. Consideration has also been given to the Airbus A220-300, which could operate at the Airport in future. As this type is expected to be the noisiest of the new generation types, a sensitivity test considering operations by it has been undertaken.

Ground noise

- 5.7.21 A ground noise assessment has been undertaken for the area around the Airport where ground noise is expected to give rise to the greatest potential noise effects. Further details of the assessment methodology for ground noise are given in Appendix 8.4 of the ES (CD1.40).
- 5.7.22 Ground noise contours have been prepared in terms of the daytime $L_{Aeq,16hr}$ index and the night-time $L_{Aeq,8hr}$ index using Datakustik CadnaA noise modelling software. For the daytime ground noise assessment this has considered the period (0700-2300), which is the standard approach for assessing daytime noise in the UK and matches the approach used in the 2015 UES.
- 5.7.23 Consideration has been given to survey work of aircraft ground operations, both at the Airport and at other UK airports.
- 5.7.24 As with air noise, a specific weekend assessment of ground noise has been undertaken, with ground noise predictions produced in terms of the $L_{Aeq,16hr}$ metric, but the predictions are based on only the aircraft movements at the weekend.

5.8 Significance criteria

Air noise - residential receptors

- 5.8.1 Absolute Levels: Based on Government guidance as described earlier, the following contour values are relevant in terms of assessing daytime airborne aircraft noise:
- 51 dB $L_{Aeq,16hr}$ which provides a threshold below which there are no observed adverse effects from air noise. This represents the LOAEL; with the exposure above it attributed a subjective description of impact of low;
 - 54 dB $L_{Aeq,16hr}$ which currently provides an indication of the onset of significant community annoyance;
 - 63 dB $L_{Aeq,16hr}$ which denotes moderate levels of community annoyance, commonly used at airports and recommended by the Government as an eligibility criterion for sound insulation schemes as I noted in Section 3 of my evidence. This value is commonly considered to represent the SOAEL; with the exposure above it attributed a subjective description of impact of medium; and
 - 69 dB $L_{Aeq,16hr}$ which denotes high levels of community annoyance where UK Government guidance is for consideration to be given by airports to assist in the costs of re-locating people from exposed dwellings, or, under certain circumstances, to offer to purchase such dwellings as I noted in Section 3 of my evidence. This represents the UAEL; with the exposure above it attributed a subjective description of impact of high.
- 5.8.2 Night-time aircraft noise can be evaluated in a number of different ways. The common method is to rate night noise in terms of noise exposure, using the $L_{Aeq,8hr}$ index (for the period 2300 to 0700). The $L_{Aeq,16hr}$ and $L_{Aeq,8hr}$ indices are the primary indicators used in this assessment, in line with those recommended by UK Government in the APF and the recent response to the air space change consultation.
- 5.8.3 The UK Government has recognised 45 dB $L_{Aeq,8hr}$ summer average as representing the LOAEL. 55 dB $L_{Aeq,8hr}$ is widely accepted⁷ as the SOAEL and has been adopted in this assessment.

⁷ E.g. Bristol airport expansion (CD8.1), London and Luton Airport expansion to 19 mppa (CD8.6), HS2 Phases 1 and 2a, Highway schemes since A14 Cambridge to Huntingdon

- 5.8.4 At the Airport night-time aircraft activity is limited to only 30 minutes between 0630 and 0659. While using the $L_{Aeq,8hr}$ metric has the effect of considering the noise across the whole night, it is common for night-time aircraft activity to be concentrated at certain times. For example, at London Heathrow around 80% of the flights from 2300 to 0659 are between 0430 - 0659. Heathrow is the largest data set captured and used as part of SoNA (CD3.7.4).
- 5.8.5 In addition, there is no policy, guidance, or research regarding the effects of $L_{Aeq,30m}$ noise contours nor the requirement or even expectation to use them. Using the same criteria as is used to assess changes in $L_{Aeq,8hr}$ contours would substantially overstate the effects, as it would suggest there was no benefit to surrounding residents of the Airport being closed for 7.5 hours of the night-time assessment period. Supplementary metrics such as L_{ASmax} have been produced for information, these provide noise information for single aircraft operations, the key results are presented in Section 8.6 of the ES, with full results given in Appendix 8.3 of the ES.
- 5.8.6 The magnitude of impact with regard to exposure to absolute noise levels at residential receptors has been categorised on a scale of Negligible, Low, Medium and High. On the basis of the above, the absolute noise values assigned to each category are given in Table 5.1.

Table 5.1: Air noise impact ratings (Absolute noise level) – Residential receptors, Outdoors

Subjective description of Impact	Daytime Criteria, dB $L_{Aeq,16hr}$	Night-Time Criteria, dB $L_{Aeq,8hr}$
Negligible	<51	<45
Low	51 (LOAEL) – 62.9	45 (LOAEL) – 54.9
Medium	63 (SOAEL) – 68.9	55 (SOAEL) – 62.9
High	≥69 (UAEL)	≥63 (UAEL)

- 5.8.7 In addition to the absolute noise level, the relative change in noise level between the DM and with DC Scenarios for future assessment years is used to assess the potential impacts from air noise. The proposed magnitude of impact ratings in relation to changes in noise level is set out in Table 5.2. A semantic scale of this type, based on the IEMA noise impact guidelines, has been widely accepted in the assessment of other UK airport development projects such as the recent Bristol Airport decision (CD8.1). The impact ratings are also consistent with those in the EIA Scoping Report (CD1.29).

Table 5.2: Air noise impact ratings - Change in Noise Level, Outdoors

Subjective description of Impact	Change in Daytime Noise Level, dB $L_{Aeq,16hr}$	Change in Night-Time Noise Level, dB $L_{Aeq,8hr}$
Negligible	0 – 1.9	0 – 1.9
Low	2 – 2.9	2 – 2.9
Medium	3 – 5.9	3 – 5.9
High	≥6	≥6

- 5.8.8 The scale of an effect is established from consideration of both the absolute noise level along with the magnitude of the change in noise level that occurs at a receptor.
- 5.8.9 The effect of a change in noise level tends to increase with the absolute level of noise experienced at a receptor. If, for example, the daytime noise level at a dwelling were to change from 45 dB to 50 dB $L_{Aeq,16hr}$, (below the LOAEL) the overall effect for the occupants would be

less than if the daytime noise level were to increase by the same amount from 63 dB to 68 dB $L_{Aeq,16hr}$ (above the SOAEL).

- 5.8.10 There is no accepted method of how to rate the scale of the effect and accordingly this has been determined based on professional judgement. Some guidance has, however, been provided in the PPG-N (CD3.7.7) which states among “*What factors influence whether noise could be a concern?*” the following: “*In cases where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in the overall noise level may result in a significant adverse effect occurring even though little or no change in behaviour would be likely to occur.*”
- 5.8.11 Table 5.3 illustrates how the scale of effect from air noise on both residential and non-residential receptors has been determined in this noise chapter based on the absolute air noise levels and associated change in noise level.
- 5.8.12 Effects that are rated as moderate or major are indicators of potential significant effects in EIA terms. Generally, a significant effect (adverse or beneficial) is considered to arise if the relative impact is rated as medium or high or if the relative impact is rated as low and the absolute impact is rated as medium or high as signified in Table 5.3.

Table 5.3: Scale of Effect Matrix

Absolute Impact	Relative Impact (noise change)			
	Negligible (0 to 1.9 dB)	Low (2 to 2.9 dB)	Medium (3 to 5.9 dB)	High (> 6 dB)
Negligible (<LOAEL)	Negligible	Negligible	Negligible	Minor
Low (LOAEL to SOAEL)	Negligible	Minor	Moderate	Moderate
Medium (SOAEL to UAEL)	Negligible	Moderate	Moderate	Moderate
High (< UAEL)	Minor	Moderate	Moderate	Major

KEY: Scale of effect	Not significant		Potential significant effect	
	Negligible	Minor	Moderate	Major

- 5.8.13 Given the specific nature of the Proposed Amendments regarding extended operational hours at the weekend, a reduction in the weekend curfew period and changes to the weekend movement limits, an assessment based on noise over the whole 92-day period is not considered to fully encapsulate the impacts. Therefore, an assessment of noise just at the weekend in the summer period has been undertaken as a supplementary indicator of the air noise impacts of the changes at the weekend. This goes above and beyond CAA guidance.
- 5.8.14 The weekend noise assessment is a supplementary metric and as such there is no specific policy or guidance on how changes in weekend noise should be interpreted. For this assessment the same criteria regarding absolute noise levels and relative changes in noise levels have been used to rate the impacts of weekend air noise, as have been used to rate the impacts of daytime air noise. This is considered to be a conservative approach, as any noise level or change in noise level experienced for only two days a week would inherently be expected to have a lesser impact than the same noise level or change in noise experienced seven days a week.

Air noise - non-residential receptors

- 5.8.15 For receptors other than dwellings, absolute levels rated as medium have been derived from the relevant guidance documents, as described in ES Appendix 8.1 (CD1.37). These are given in Table 5.4. The significance of an effect depends on both the absolute impact and the relative impact. The effect on each non-residential receptor has been rated as significant if the absolute noise level is rated as medium, i.e. above the threshold given in Table 5.4 and the relative impact is rated as a medium or higher, i.e. a change in noise level of at least 3 dB(A).
- 5.8.16 For the non-residential receptors the approach to weekend criteria is the same as that for the residential receptors, with the same criteria used for daytime and weekend. The exception is schools, which have not been assessed for the weekend or night-time as they would not generally be expected to be open. Similarly outdoor amenity areas have not been assessed for night-time as many will be closed and even if not closed, the use of such areas at night is limited.

Table 5.4: Air Noise Impact Thresholds (Absolute) – Non-Residential, Outdoors

Receptor	Daytime Noise Level Threshold	Night-Time Noise Level Threshold
Schools (08:00-16:00)	55 dB $L_{Aeq,30m}$	n/a
Residential Healthcare Buildings	55 dB $L_{Aeq,1h}$	50 dB $L_{Aeq,1h}$
Outdoor Amenity Areas	55 dB $L_{Aeq,16hr}$	n/a

- 5.8.17 The criteria relating to schools is required to be met over a 30-minute period, not over 16 hours. From Table 8-40 in Chapter 8 of the ES (CD1.15) it can be deduced that during the school hours, L_{Aeq} noise levels could be around 3 dB higher than the 16-hour average. Based on this, a criterion of 52 dB $L_{Aeq,16hr}$ has been used to represent 55 dB $L_{Aeq,30m}$.
- 5.8.18 The criteria relating to residential healthcare buildings is based on a 1 hour period, not 16 hours for daytime or 8 hours for night-time. As with schools, for the daytime assessment an allowance of 3 dB has been made based on Table 8-40 in the ES, resulting in a criterion of 52 dB $L_{Aeq,16hr}$, which has been used to represent 55 dB $L_{Aeq,1h}$.

Ground noise - residential receptors

- 5.8.19 There is no definitive agreement on the method of assessment of aircraft ground noise. Various methods have been adopted in the past, and these have led to the assessment of ground noise in terms of the equivalent continuous sound level, $L_{Aeq,T}$, for various time periods. The daytime period has been assessed using the $L_{Aeq,16hr}$ metric (0700 to 2300) and the night-time period has been assessed using the $L_{Aeq,8hr}$ metric (2300 to 0700).
- 5.8.20 Absolute ground noise level thresholds for assessment are presented in Table 5.5.
- 5.8.21 The ground noise level assessed at various receptors can be compared to the existing ambient environmental noise and published guidelines for the assessment of environmental noise. The WHO have previously recommended a guideline value of 50 dB $L_{Aeq,16hr}$ to prevent 'moderate' community annoyance and 55 dB $L_{Aeq,16hr}$ for 'serious' community annoyance.
- 5.8.22 To put these guidance criteria into context, over half of the population UK population was estimated to be exposed to levels which exceed the 55 dB L_{Aeq} guideline for 'serious' community annoyance from the results of the Defra funded 2000/2001 National Noise Incidence Study.

- 5.8.23 The ambient noise levels in the area around the Airport have been measured at the baseline survey locations and found to lie in the range 52 dB to 64 dB $L_{Aeq,T}$ during the daytime with an underlying background noise level in the range 45 dB to 59 dB L_{AF90} . During the night-time, ambient noise levels have been measured to lie in the range 47 dB to 60 dB $L_{Aeq,T}$ with underlying background noise levels in the range 42 dB to 58 dB L_{AF90} . The background noise levels better reflect the noise environment in the absence of aircraft noise and other intermittent environmental noise sources.

Table 5.5: Ground Noise Impact Ratings (Absolute) – Outdoors

Subjective description of Impact	Daytime Criteria, dB $L_{Aeq,16hr}$	Night-Time Criteria, dB $L_{Aeq,8hr}$
Negligible	<50	<45
Low	50 (LOAEL) – 59.9	45 (LOAEL) – 54.9
Medium	60 (SOAEL) – 69.9	55 (SOAEL) – 64.9
High	≥70 (UAEL)	≥65 (UAEL)

- 5.8.24 The LOAEL values in Table 5.5 are consistent with British Standard BS8233 (CD3.7.24) which recommends daytime indoor noise levels of 35 dB $L_{Aeq,16hr}$ within living rooms and night-time indoor noise levels of 30 dB $L_{Aeq,8hr}$ within bedrooms. These recommended levels would be achieved with windows partly open (assuming, as is standard, a difference of 15 dB between outdoor and indoor noise levels when windows are open) if noise levels were at or below the LOAEL values in Table 5.5.
- 5.8.25 If windows are closed, an additional protection of around 10 dB can be expected (i.e. a total difference of up to 25dB). If ground noise were to rise above these levels (i.e. 60dB $L_{Aeq,16hr}$ daytime and 55dB $L_{Aeq,8hr}$ night-time), some form of additional mitigation, such as sound insulation treatment to the dwelling, would be required to protect people inside dwellings from the effects of ground noise. This is consistent with the SOAEL values in Table 5.5.
- 5.8.26 Sound insulation can only provide so much protection to a dwelling, typically around 35 dB, and once the noise level outside a dwelling rises beyond a certain value, mitigation in itself will not provide sufficient protection. This is consistent with the UAEL values in Table 5.5.
- 5.8.27 Based on this preceding context, the absolute noise values used to assess ground noise at the modelled receptors are given in Table 5.6. These $L_{Aeq,T}$ levels are based on BS8233 and WHO guidance and professional judgement. The daytime values for LOAEL, SOAEL and UAEL match those in the Updated Environmental Statement produced in 2015 for the appeal relating to the CADP1 Application or “2015 UES” (CD2.6.4). The 2015 UES did not separately consider ground noise at night. In addition to the absolute noise level, the relative change in noise level between the DM and with DC Scenarios for future assessment years is used to assess ground noise. A potential impact rating for a change in level is given in Table 5.6. A semantic scale of this type, based on the IEMA noise impact guidelines, has been accepted in various airport Public Inquiries such as those for Bristol Airport and London Luton Airport.

Table 5.6: Ground Noise Impact Ratings (Relative) – Outdoors

Subjective description of Impact	Change in Daytime Noise Level, dB L _{Aeq,16hr}	Change in Night-Time Noise Level, dB L _{Aeq,8hr}
Negligible	0 – 1.9	0 – 1.9
Low	2 – 2.9	2 – 2.9
Medium	3 – 5.9	3 – 5.9
High	≥6	≥6

5.8.28 The approach to assessing the scale of effect and significance associated with ground noise is the same as set out previously for air noise and shown in Table 5.3.

5.8.29 As for air noise, a specific weekend assessment of ground noise has been undertaken. Weekend noise predictions are a supplementary metric and as such there is no specific policy or guidance on how changes in weekend noise should be interpreted. For this assessment the same criteria regarding absolute noise levels and relative changes in noise levels have been used to rate the impacts of weekend ground noise, as have been used to rate the impacts of daytime ground noise. This is considered to be a conservative approach, as any noise level or change in noise level experienced for only two days a week would inherently be expected to have a lesser impact than the same noise level or change in noise experienced seven days a week.

6. Embedded mitigation and compensation

6.1 Introduction

6.1.1 The Airport operates a range of mitigation and control measures in relation to noise. As part of the CADP1 permission new schemes designed to mitigate the noise impact of aircraft operations have been introduced or are in the process of being introduced at the time of writing. These, together with the short runway length and steep approach angle, limit the types of aircraft which can operate from the Airport.

6.1.2 The Airport is committed to meeting the government's OANPS (CD3.7.3):

“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”. [paragraphs 3 and 4]

6.1.3 Most of the Airport's noise mitigation measures benefit everyone who experiences noise from the Airport, both those within and those outside of the air noise contours. The various ground noise monitoring and mitigation measures primarily benefit those closest to the Airport; particularly in the Camel Road area, as this is the area most exposed to ground noise from the Airport. The Airport's sound insulation scheme benefits those within the relevant noise contours.

6.2 Continuing best practice noise control at London City Airport

6.2.1 The Airport operates many existing mitigation and control measures in relation to noise as set out in the Airport's Noise Action Plan (CD5.4 and CADP1 Permission), and these have been considered as embedded mitigation in the noise assessment presented in Section 8.5 of Chapter 8 of the ES (CD1.15). These continuing mitigation and control measures include:

- a. Aircraft movement limits* (Conditions 22 to 27 of the CADP1 planning permission);
- b. Restrictions on airport operating hours* (Conditions 8 and 17 of the CADP1 Permission);
- c. Noise abatement departure and arrival procedures (as defined by the Noise Management and Mitigation Strategy (NOMMS) that is secured by Conditions 31 of the CADP1 Permission);
- d. Combined noise and track monitoring systems (as defined by the NOMMS, secured by Conditions 30 and 31 of the CADP1 Permission);
- e. Quiet operating procedures (as defined by the NOMMS, secured by Conditions 31 of the CADP1 Permission);
- f. Departure noise incentives and penalties scheme including a fixed penalty for exceeding upper noise limits is charged at a rate of £600 per dB of exceedance. The money from any penalties accrued is added to the Community Fund;
- g. Ground noise controls, including restrictions on the timing and noise levels of ground engine running and limitations on the use of Auxiliary Power Units (APUs) (Condition 8 of the CADP1 Permission);

- h. Noise contour area limits* set by the Noise Contour Strategy that seeks to reduce the area of the noise contour by 2030 and every 5 years thereafter (Condition 33 of the CADP1 Permission);
- i. Quota Count (QC) limits in accordance with the Appellant's innovative Aircraft Noise Categorisation Scheme (ANCS) (Conditions 18 and 19 of the CADP1 Permission);
- j. Airport perimeter noise barriers (Conditions 53 and 54 8 of the CADP1 planning permission);
- k. Sound Insulation Schemes (SIS)* secured by the section 106 agreement for the CADP1 Permission (CD12.1) and is proposed to be enhanced as I will come to later in my evidence; and
- l. Community Fund* that is secured by the section 106 agreement for the CADP1 Permission and that will be improve as part of the Proposed Amendments.

Note*: altered as part of the Proposed Amendments

6.3 Quieter new generation aircraft

- 6.3.1 As embedded mitigation for the Proposed Amendments only quieter new generation aircraft will be allowed to operate in the newly extended period on a Saturday and undertake flights above the currently permitted number in the early morning period (0630 to 0659). To qualify as 'new generation' an aircraft must meet the following more stringent noise criteria, which are based on the range of certification noise levels for the new generation aircraft types used in this assessment:
- a. Have a flyover level not exceeding 85.0 EPNdB,
 - b. Have a sideline level not exceeding 89.0 EPNdB,
 - c. Have an approach level not exceeding 93.0 EPNdB, and
 - d. Have a sum of its three certificated noise levels not exceeding 263.0 EPNdB.
- 6.3.2 These limits are lower than those in the existing ANCS and represent a reduction of 3 dB in the flyover level, 4.5 dB in the sideline level, 5 dB in the approach level, and 8 dB in the combined level. This restriction would preclude current generation aircraft such as the current generation Embraer E170 which is the most commonly flown aircraft in the existing fleet.
- 6.3.3 The definition and parameters for new generation aircraft has been agreed with LBN and are proposed to be secured via a planning condition.
- 6.3.4 Table 8-7 in the ES (CD1.15) sets out examples of the aircraft that meet or beat this specification. Two of the key new generation aircraft types in the future forecast already operate at London City Airport. This includes the Airbus A220-100 and the Embraer E190-E2, which are forecast to make up more than half the future fleet by 2031. The modelling of these key aircraft types is based on measurements taken of these aircraft operating at the Airport. These measurements and Table 8-7 of the ES (CD1.15) clearly demonstrate that the new aircraft are quieter than existing aircraft such as the Embraer E190. The only future aircraft in the core forecasts which do not currently operate are the Embraer E195-E2. The E195-E2 is very similar to the E190 E2, being slightly larger, and it has been modelled as slightly louder than the E190-E2, with the difference included in the modelling based on measured certification noise data. The A220-300 is the subject of a sensitivity test as I described in Section 5.4 of my evidence.
- 6.3.5 Due to the incentives of longer overall operating hours and greater flexibility, and the noise criteria which require that only 'new generation' aircraft can be flown in the new slots (as secured by a proposed new planning condition), the airlines are forecasting to re-fleet to quieter aircraft sooner in the Development Case scenario than in the Do-Minimum scenario. As set out in the evidence of Louise Congdon (APP/1), the Proposed Amendments act as an incentive to accelerate the transition to 'new generation' aircraft which are both cleaner and quieter.

6.4 Proposed (enhanced) Sound Insulation Scheme (“SIS”)

- 6.4.1 As I noted earlier in my proof, I refer to noise insulation as ‘compensatory mitigation’. This is because noise insulation is defined in Government noise policy as ‘compensation’, and it is applied at the end of the noise management hierarchy. However, it is a compensation measure that can be used as mitigation to reduce adverse effects. The term ‘compensatory mitigation’ is therefore used for these reasons, and to differentiate noise insulation from other measures of financial compensation.
- 6.4.2 As I will set out in my evidence, the assessment reported in Chapter 8 of the ES (CD1.15) has shown that there are no new or materially different significant operational noise effects resulting from the Proposed Amendments when compared to those identified previously in the 2015 UES. Therefore, no further mitigation is required to reduce the noise beyond that introduced as part of the CADP1 permission and outlined in Section 6.2 above. Nevertheless, the Airport is proposing to enhance the SIS as part of the Proposed Amendments, after reviewing the SIS schemes to ensure that they offer appropriate compensatory mitigation to those potentially affected (as required by the APF). The SIS is in line with the government expectations (CD3.7.8), that I set out at Section 3. The enhancements also proactively respond to the anticipated increased expectation from Government as trailed in Aviation 2050 consultation document (CD3.5.4) that I also set out at Section 3.
- 6.4.3 The enhanced schemes feature a wider scope, including a lower noise threshold for eligibility in one of the categories of the SIS, and a simplification of the process for obtaining works to enhance take up. These will enhance the effectiveness of the SIS. Table 6.1 summarises the current and proposed (enhanced) SIS that are secured by the S106 planning obligations.

Table 6.1: Current and Proposed Air Noise SIS

Tier	Current SIS	Proposed enhanced SIS	Budgeted Cost per Property of Proposed SIS
First Tier* (called Low Tier in the ES Table 8-109)	Dwellings within the 57 dB $L_{Aeq,16hr}$ daytime contour Full cost of mechanical vents for all dwellings and full cost of secondary or standard double glazing where only single glazing is fitted.	Dwellings within the 57 dB $L_{Aeq,16hr}$ daytime contour Full cost of mechanical vents for all dwellings and full cost of secondary or standard double glazing where only single glazing is fitted.	£5,000
Intermediate Tier* (called Middle Tier in the ES Table 8-109)	Dwellings within the 63 dB $L_{Aeq,16hr}$ daytime contour Full cost of secondary glazing and mechanical vents or a grant of £3,400 towards high acoustic performance double glazing.	Dwellings within the 63 dB $L_{Aeq,16hr}$ daytime or 60 dB $L_{Aeq,16hr}$ weekend contours. Daytime threshold for eligibility to reduce to 60 dB $L_{Aeq,16hr}$ by 2031. Full cost of secondary glazing or a contribution towards high acoustic performance double glazing based on the cost of fitting secondary glazing to the specific property, as well as mechanical vents.	£8,000
Second Tier* (called High Tier in the ES Table 8-109)	Dwellings within the 66 dB $L_{Aeq,16hr}$ daytime contour Full cost of high acoustic performance double glazing and mechanical vents.	Dwellings within the 66 dB $L_{Aeq,16hr}$ daytime or 55 dB $L_{Aeq,8hr}$ night-time contours Full cost of high acoustic performance double glazing and mechanical vents.	£10,000

** Note: the Tier names used here are those now used in the draft update to the s106 agreement as agreed with LBN and the other interested parties named in the draft agreement*

Second Tier Scheme

- 6.4.4 For eligible properties within the Second Tier Scheme, thermal double glazing is not sufficient and so properties in this tier are offered high acoustic performance double glazing and mechanical ventilation that would provide around 35 dB reduction from outdoor noise levels.
- 6.4.5 This tier is to be enhanced by expanding eligibility with an additional criterion to be introduced from implementation of the permission based on the 55 dB $L_{Aeq,8hr}$ summer night-time contour to address the additional flights proposed in the morning. This will ensure that everyone exposed to air noise above the SOAEL in the daytime, night-time or weekend is eligible for sound insulation works from commencement of the Proposed Development.
- 6.4.6 Based on properties treated to date the Appellant has budgeted for a cost of £10,000 per property. However, if the costs for a property are higher, the Appellant will pay the extra so there will be no cost to residents.

Intermediate Tier Scheme

- 6.4.7 For eligible properties within the Intermediate Tier Scheme, secondary glazing is offered to improve the performance of the existing windows, in addition to mechanical ventilation (with installation managed by the Appellant and carried out by its contractors). Whilst secondary glazing provides the necessary reduction for internal noise levels at this noise exposure, the Airport recognises that some residents will have a preference for enhanced double glazing for aesthetic purposes. As an alternative therefore, to improve uptake, residents can receive a cash grant towards installing high acoustic performance double glazing, which they procure themselves, and mechanical ventilation. This grant was initially set at £3,000 under the current scheme but is inflation linked and currently stands at £4,219.
- 6.4.8 To enhance this tier and improve its accessibility, it is proposed to change its administration so that installations of high acoustic performance double glazing and mechanical ventilation are also managed by the Appellant and carried out by its contractors. It is also proposed to increase the financial contribution from the Appellant. Take up of the fixed cash offer is currently low because residents still need to make sizeable contributions towards high acoustic performance glazing and arrange the works themselves.
- 6.4.9 As such, under the revised scheme, property owners will retain the ability to have secondary glazing and mechanical ventilation installed at no cost to them. Where they instead wish to have high acoustic performance double glazing and mechanical ventilation, the Appellant will arrange installation and make an enhanced contribution dependent on the property but up to the cost of installing secondary glazing and mechanical vents. The property owner will need to contribute the difference (if any) between the cost of installing secondary glazing and high acoustic performance double glazing.
- 6.4.10 It is also proposed to extend eligibility to this tier such that, from implementation of the Proposed Development, works will also be offered to dwellings within the 60 dB $L_{Aeq,16hr}$ summer weekend daytime contour. In addition, the Appellant will phase in an extension of the summer daytime threshold, with the eligibility threshold being set at 62 dB $L_{Aeq,16hr}$ from 2027, 61 dB $L_{Aeq,16hr}$ from 2029 and 60 dB $L_{Aeq,16hr}$ from 2031.

First Tier Scheme

- 6.4.11 In the First Tier Scheme, properties eligible under the scheme are offered acoustic ventilation and single glazed properties are offered standard thermal glazed windows or secondary glazing, whichever is preferred. As I have noted above, the eligibility threshold for the First Tier Scheme goes beyond current (CD3.7.8) and emerging (CD3.5.4) Government expectations for airport noise insulation schemes and no improvements to the scheme to provide further mitigation are required.

Eligibility for the SIS

- 6.4.12 Eligibility criteria are set out as part of the enhanced SIS in the s106 agreement. When comparing the eligibility noise levels thresholds with the calculated noise contours and population counts for the Development Case as I present in section 7 of my evidence, it is important to bear in mind that the SIS and enhanced SIS do not apply to residential dwellings that have been built since the CADP1 permission was granted. The ‘Agent of Change Principle’ from paragraph 187 of the NPPF (CD3.2.1) requires that planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities. It can therefore be reasonably assumed that new developments within SIS eligibility contours built or permitted since the CADP1 permission would be designed and built with appropriate façade insulation to account for the existing (and future as permitted by CADP1) aircraft noise exposure. An indication of the scale of new development within the period between the granting of the CADP1 permission and 2022 within the SIS eligibility noise contours can be construed by comparing Tables 8-60 and 8-61 from Chapter 8 of the ES (CD1.15). These tables present populations within various noise contours with and without permitted developments and indicate that accounting for permitted developments increases the population in the 57dB contour by approximately a factor of 2 and increases the population in the 63dB contour by approximately a factor of 5. This suggests that a substantial proportion of population and households reported in the 2025 contours and beyond would have been built since the CADP1 permission and hence already be designed and built with appropriate façade insulation to mitigate aircraft noise.

6.5 Saturday evening curfew

- 6.5.1 As a result of consultation responses, the Appellant reduced the proposed extension of operating hours on Saturdays from 2230 to 1830, with an allowance for 12 arrivals only until 1930 during the summer season (British Summer Time) to reflect the greater likelihood of delays in this busy period. This change protects the Saturday evening period (1900 - 2300) defined in the Environmental Noise Regulations and maintains a curfew from Saturday evening through to Sunday lunchtime.

6.6 Enhancement of the Airport’s community fund

- 6.6.1 As part of the Proposed Development, LCY will secure, through the Section 106 Agreement, enhancements to the London City Airport Community Fund (the “Fund”). The Fund was launched in 2019 and has, to date, contributed over £400,000 to over 120 local charities and not-for-profit organisations. In recognition of the need to compensate for the reduction in the Saturday afternoon curfew, LCY will contribute £3.85m in funding to the Fund for a period of 10 years from implementation of the planning permission if granted as a result of the Appeal.
- 6.6.2 Through the Fund, funding will be available for projects which contribute to improving amenity in areas local to the Airport and along its flight paths including, but not limited to, creation of/improvements to playgrounds, parks, sporting facilities and community recreation facilities.

7. Assessment of effects

7.1 Introduction

- 7.1.1 Chapter 8 of the Environmental Statement (ES) (CD1.15) assesses the likely effects of the Proposed Development due to noise and vibration⁸. The chapter presents an assessment of the noise impacts associated with the Proposed Development including changes in:
- flights into and out of the Airport (air noise);
 - aircraft operations at the Airport (ground noise);
 - road traffic movements related to the Airport (road traffic noise); and
 - construction of the remaining elements from the CADP1 permission that have not as yet been built (construction noise).
- 7.1.2 Most of the noise assessment (Chapter 8), and the whole of the community health assessment (Chapter 12) (CD1.19), are common ground with LBN as noted in the Statement of Common Ground (CD11.2). I will outline the limited areas of difference in the next section of my evidence in my response to RfR1.
- 7.1.3 The following parts of my evidence summarise the noise assessment presented in Chapter 8 of the ES (CD1.15).
- 7.1.4 This section commences with a summary of the forecast changes in air and ground noise over time based on each of the Primary and Supplementary Indicators. This is followed by a detailed discussion of the Predicted Air Noise Effects and their Significance comparing the Do Minimum (DM) and Development Case (DC) Scenarios for each assessment year. Further information is presented in Chapter 8 and Appendix 8.3 of the ES.
- 7.1.5 I have provided a short summary regarding road noise and construction noise for completeness even though these are matters of common ground with LBN.

7.2 Air noise

Air Noise: Primary Indicators

Daytime

- 7.2.1 The areas of the key daytime air noise contours, 06:30 to 22:29, are presented in Table 7.1 for all assessment years and scenarios. These contours are presented in Figure 8.3.4 to Figure 8.3.10 in Appendix 8.3 of the ES, reproduced in Appendix 2 of this proof (APP/2/B/2). Due to the increase in low noise aircraft incentivised by the Proposed Amendments, the 57 dB $L_{Aeq,16hr}$ contour area calculated for when the Airport would reach 9 mppa is 20% smaller than the current contour limit of 9.1 km².

⁸ Core case and faster and slower growth sensitivity tests

Table 7.1 Air Noise Contour Areas, $L_{Aeq,16hr}$ Average Mode Summer Day

Contour, dB $L_{Aeq,16hr}$	Contour Area, km ²						
	2019	2025 DM	2025 DC	2027 DM	2027 DC	2031 DM	2031 DC
51 (LOAEL)	26.7	26.7	26.3	27.0	20.9	21.4	22.7
57 (Contour Area Limit)	8.7	8.6	8.5	8.8	6.5	6.7	7.2
63 (SOAEL)	2.3	2.3	2.2	2.3	1.7	1.8	1.9
69 (UAEL)	0.6	0.6	0.6	0.7	0.5	0.5	0.6

7.2.2 I will set out the set out the significance of the noise levels and change in noise levels that result from the Proposed Development later in my evidence.

Night-Time

7.2.3 The areas of the key night-time air noise contours are presented in Table 7.2 for all assessment years and scenarios. These contours are presented in Figure 8.3.11 to Figure 8.3.17 in Appendix 8.3 of the ES, reproduced in Appendix 2 of this proof (APP/2/B/3). I note the population counts within noise contours later in this section.

Table 7.2: Air Noise Contour Areas, $L_{Aeq,8hr}$ Average Mode Summer Night

Contour, dB $L_{Aeq,8hr}$	Contour Area, km ²						
	2019	2025 DM	2025 DC	2027 DM	2027 DC	2031 DM	2031 DC
45 (LOAEL)	4.5	7.8	10.6	7.8	7.1	7.1	7.3
55 (SOAEL)	0.5	0.9	1.2	0.9	0.8	0.8	0.9
63 (UAEL)	0.1	0.2	0.3	0.2	0.2	0.2	0.3

7.2.4 I will set out the set out the significance of the noise levels and change in noise levels that result from the Proposed Development later in my evidence.

Air Noise: Supplementary Indicators

Weekend Daytime

7.2.5 The areas of the key weekend daytime air noise contours are presented in Table 7.3 for all assessment years and scenarios. These contours are presented in Figure 8.3.18 to Figure 8.3.24, in Appendix 8.3 of the ES, reproduced in Appendix 2 of this proof (APP/2/B/3).

Table 7.3 Air Noise Contour Areas, $L_{Aeq,16hr}$ Average Mode Summer Weekend Day

Contour, dB $L_{Aeq,16hr}$	Contour Area, km ²						
	2019	2025 DM	2025 DC	2027 DM	2027 DC	2031 DM	2031 DC
51 (LOAEL)	15.2	15.0	15.1	15.2	13.5	11.9	15.1
63 (SOAEL)	1.1	1.1	1.1	1.1	1.0	0.9	1.2
69 (UAEL)	0.4	0.4	0.4	0.4	0.4	0.3	0.4

- 7.2.6 I will set out the significance of the noise levels and change in noise levels that result from the Proposed Development later in my evidence.

L_{den} and L_{night} , Annoyance (day), Sleep disturbance (night) and L_{ASmax}

- 7.2.7 Analysis of these parameters show broadly similar results to the $L_{Aeq,16hr}$ and $L_{Aeq,8hr}$ metrics. The results are given in detail in Appendix 8.3 of the ES (CD1.39) and the associated Figures.

N65 Daytime

- 7.2.8 As noted by government and CAA guidance, the above contours provide supplementary information both within and further afield than the UAEL, SOAEL and LOAEL contours.
- 7.2.9 The summer N65 daytime contours have been prepared at values of 10, 25, 50, 100 and 200 events. The areas of the N65 daytime air noise contours are presented in Table 7.4 and population counts are presented in Table 7.5 for all assessment years and scenarios. These contours are presented in Figures 8.3.39 to 8.3.45 of the ES, reproduced in Appendix 2 of this proof (APP/2/B/2). Further explanation of these contours is given in the earlier part of my evidence. The population counts within these contours are presented in Table 7.5. The N65 results are presented in detail in Appendix 8.3 of the ES (CD1.39).

Table 7.4 Air Noise Contour Areas, N65 Average Mode Summer Day

N65 Contour, Events (avg per hour)	Contour Area, km ²						
	2019	2025 DM	2025 DC	2027 DM	2027 DC	2031 DM	2031 DC
10 (<1)	106.7	106.8	105.7	106.5	71.4	83.3	69.3
25 (1.5)	66.4	69.9	62.6	67.0	44.0	46.4	45.3
50 (3)	64.6	31.9	30.9	31.8	21.8	22.0	22.5
100 (6)	12.4	11.6	12.4	12.8	12.9	12.3	16.7
200 (12)	1.1	0.9	1.0	1.2	1.5	1.4	1.8

Table 7.5: Air Noise Population Counts, N65 Average Mode Summer Day

N65 Contour, Events (avg duncper hour)	Number of People excluding Permitted Developments						
	2019	2025 DM	2025 DC	2027 DM	2027 DC	2031 DM	2031 DC
10 (<1)	802,800	803,250	796,800	799,250	577,600	660,200	557,100
25 (1.5)	552,450	573,550	515,200	558,650	334,000	362,300	344,600
50 (3)	276,200	266,050	254,900	265,150	171,300	172,950	177,450
100 (6)	78,050	73,600	79,000	80,300	81,250	77,700	120,100
200 (12)	1,700	600	1,700	3,450	7,100	5,700	8,150

- 7.2.10 The daytime N65 contours do not generally vary in as consistent a manner between the DM and DC Scenarios as other metrics, however some general comparisons are given below;
- The N65 10 event contours cover all the arrival and departure routes. For the departure routes the contours end around where the altitude holds typically end and the aircraft resume climbing. For the arrival routes the contours end around the start of the altitude holds where aircraft temporarily stop descending. These points are different for each route and are controlled by air traffic control.
 - The N65 200 event contours are relatively small only extending up to the dock edge in some areas.
 - The 2027 DC N65 10 contour is smaller than that for the 2027 DM Scenario, due to the increased use of quieter new generation aircraft in the DC Scenario. Whereas the N65 100 event and N65 200 event contours for the 2027 DC Scenario are larger than those for the 2027 DM Scenario, due to the greater number of aircraft movements in the DC Scenario;
 - The 2031 DC N65 10 event contour is slightly smaller than that for the 2031 DM Scenario, due to the increased use of quieter new generation aircraft in the DC Scenario. Whereas the N65 100 event contour for the 2031 DC Scenario is larger than that for the 2031 DM Scenario, due to the greater number of aircraft movements in the DC Scenario. The N65 200 event contours are similar for both scenarios;
 - For the DM Scenario 2025 and 2027 are very similar for all contour levels. The N65 10 event contours get smaller by 2031, due to the increased use of quieter new generation aircraft. The N65 100 event and 200 event contours remain broadly similar in each of the assessment years; and
 - For the DC Scenario the N65 10 event contours get smaller in 2027 and 2031 due to more rapid transition to quieter new generation aircraft. The N65 100 event and 200 event contours get slightly larger over time, due to the increase in aircraft movements.

N60 Night-time

- 7.2.11 N60 contours are generally prepared at a minimum contour level of 10 events. There are not currently more than 10 events (flights) per summer night on average nor are there forecast to be under the DM or DC future scenarios. Therefore, N60 noise contours have not been presented. This is also the case for the Proposed Early Morning Limit Scenario. Noise from individual events at night are considered in the L_{ASmax} assessment below.

N65 Weekend Daytime

- 7.2.12 There were not as many as 200 events (flights) per summer weekend day in any of the assessed weekend scenarios. Therefore, N65 weekend contours have been prepared at values of 10, 25, 50 and 100 events. The areas of the N65 weekend air noise contours are presented in Table 7.6 for all assessment years and scenarios. These contours are presented in Figures 8.3.46 to 8.3.52 in the ES, reproduced in Appendix 2 of this proof (APP/2/B/2). Further explanation of these contours is given earlier in my evidence. The population counts within these contours are presented in Table 7.7. The weekend N65 results are presented in detail in Appendix 8.3 of the ES (CD1.39).

Table 7.6: Air Noise Contour Areas, N65 Average Mode Summer Weekend Day

N65 Contour, Events (avg per hour)	Contour Area, km ²						
	2019	2025 DM	2025 DC	2027 DM	2027 DC	2031 DM	2031 DC
10 (<1)	87.3	84.9	81.4	84.6	48.6	52.5	50.0
25 (1.5)	28.6	31.5	30.2	31.3	22.7	21.8	33.2
50 (3)	12.1	9.5	12.6	12.0	17.1	11.7	18.7
100 (6)	1.1	0.6	1.2	1.0	2.3	1.3	2.7

Table 7.7: Air Noise Population Counts, N65 Average Mode Summer Weekend Day

N65 Contour, Events (avg per hour)	Number of People excluding Permitted Developments						
	2019	2025 DM	2025 DC	2027 DM	2027 DC	2031 DM	2031 DC
10 (<1)	685,150	675,900	639,250	670,050	377,650	420,850	383,150
25 (1.5)	227,550	264,000	246,050	262,050	179,700	171,100	264,700
50 (3)	73,900	59,400	79,750	75,700	125,800	72,950	144,750
100 (6)	1,550	120	3,450	1,200	9,350	4,100	10,900

7.2.13 The populations within the N65 weekend contours broadly vary in line with the change in the areas of the contours, as would be expected. The weekend N65 contours do not generally vary in as consistent a manner between the DM and DC Scenarios as other metrics, however some general comparisons are given below.

- The 2031 DC weekend N65 10 event contour is slightly smaller than that for the 2031 DM Scenario and much smaller than that for 2019. This is due to the reduced use of the noisier current generation Embraer E190 in the 2031 DC Scenario. The new generation aircraft that replace it are quieter and therefore expose a smaller area to at least 65 dB L_{ASmax} .
- The 2031 DC weekend N65 25 event contour is generally similar to that for the 2031 DM Scenario except to the west and south of the Airport. In this area there are sufficient easterly arrivals in the DC Scenario to generate a 25 event contour for the level section of the easterly arrival track, but for the 2031 DM Scenario there are only sufficient arrivals to generate a 10 event contour.
- Compared to 2019, the 2031 DC weekend N65 25 event contour is smaller to the north of the Airport due to fewer departures by the current generation Embraer 190. To the west and south of the Airport the 2031 DC contour is larger, as there were insufficient easterly arrivals in 2019 to generate a 25 event contour for the level section of the easterly arrival track.
- The 2031 DC weekend N65 50 event contour is larger than that for the 2031 DM Scenario and that for 2019. This is due to greater number of weekend movements in the DC Scenario, which results in there being sufficient westerly arrivals and westerly departures to generate a 50 event contour. For the 2031 DM Scenario and 2019, the 50 event contour is formed by the overlap of westerly departures and easterly arrivals to the west of the Airport, and the overlap of easterly departures and westerly arrivals to the east of the Airport. As these contours are formed by the overlap of multiple operations, they are smaller only covering the areas exposed to 65 dB L_{ASmax} by both pairs of operations.

- e. Similarly, the 2031 DC weekend N65 100 event contour is slightly larger than that for the 2031 DM Scenario and that for 2019. This is due to greater number of weekend movements in the DC Scenario, which results in there being sufficient westerly departures and easterly departures to generate a 100 event contour in the areas they overlap. For the 2031 DM Scenario, the 100 event contour is formed by the overlap of westerly departures and easterly departures and westerly arrivals. As these contours are formed by the overlap of three sets of operations, rather than just two in the DC Scenario, they are smaller only covering the areas exposed to 65 dB $L_{A_{Smax}}$ by all three sets of operations.

Single Mode

- 7.2.14 Single mode L_{Aeq} noise contours have been produced which show how, under westerly and easterly conditions, noise exposure levels will vary between scenarios for the daytime, night-time and weekend. The results are presented in detail in Appendix 8.3 (CD1.39) and the contours are shown in Figures 8.3.60 to 8.3.101 of the ES, reproduced in Appendix 2 of this proof (APP/2/B/3).
- 7.2.15 The number of people exposed between scenarios generally varies in a similar manner to the average mode L_{Aeq} contours. A feature is under easterly operations the 51 dB $L_{Aeq,16hr}$ daytime contour extends further from the Airport, as the contour includes the area where aircraft are held at 2,000 ft on approach. This is the same for 2019 and all future scenarios. Small parts of the 54 dB $L_{Aeq,16hr}$ contour are also affected for 2019 and some of the future scenarios. The 57 dB $L_{Aeq,16hr}$ and higher noise level contours are not affected.
- 7.2.16 The night-time contours are not affected due to the lower noise levels in this period. The weekend contours are generally not affected either, with the exception of the 51 dB $L_{Aeq,16hr}$ contour for the 2031 DC Scenario. The change between the 2031 DM and DC Scenarios for the 51 dB contour appears visually large, but changes in noise levels in this area are less than 2 dB (negligible relative impact), with noise just below 51 dB for the DM Scenario and just above for the DC Scenario.
- 7.2.17 The westerly mode contours are also not affected, as the altitude hold for westerly approaches is 3,000ft. The quieter noise levels resulting from this greater altitude means that the contour does not extend over the area under the level section of the westerly approach.

Curfews

- 7.2.18 In 2019 and under the DM Scenario there are 72 predictable curfew hours per week when the Airport is closed. Under the DC Scenario this would reduce to 65 hours per week in the winter season and 64 hours per week in the summer season, due to the proposed extended operational hours on a Saturday, this is a reduction of around 10%.
- 7.2.19 There are no recognised criteria for the assessment of curfew or a change in the amount of respite. It is important to recognise that the number of curfew hours for residents around the Airport is very high and very unusual. Even with the proposed reduction on a Saturday the curfew hours at the Airport will remain very high, with no other major UK airport having such restrictive operating hours and London's other four passenger airports permitted to open 24 hours a day, seven days a week albeit with a voluntary curfew at Heathrow on scheduled long haul arrivals before 0430 and scheduled departures before 0600 as I have already noted in my evidence.

- 7.2.20 In addition to the predictable periods of curfew when the Airport is closed, many of the people affected by aircraft noise from the Airport are only overflowed by either westerly or easterly operations, not both. For those who are only overflowed by westerly operations, this occurs around 70% of the time on average, which equates to around 30 additional hours of respite per week on top of the curfew hours. For those who are only overflowed by easterly operations, this only occurs around 30% of the time on average, which equates to around an additional 70 hours of respite per week on top of the curfew hours.

7.3 Predicted Air Noise Effects and their Significance

- 7.3.1 This section sets out the air noise effects arising from the Proposed Development by comparing the results of the Do Minimum (DM) Scenario to those of the Development Case (DC) Scenario. A subjective account of how noise conditions will change between 2019 (the baseline year) and the 2031 DM and DC Scenarios has also been included to provide context. To summarise, the assessment of effects is based on a comparison of the following key scenarios:
- 2019 vs 2031 DM and 2031 DC;
 - 2025 DM vs 2025 DC;
 - 2027 DM vs 2027 DC; and
 - 2031 DM vs 2031 DC.

2019 (Baseline Year) vs 2031 DM and DC Scenarios

- 7.3.2 The Airport is forecast to grow to its current passenger limit of 6.5 mppa by 2031 under the DM Scenario. Annual aircraft movements are forecast to increase from 83,963 in 2019 to 94,000 in 2031. This increase will be accompanied by the replacement of many of the most common aircraft at the Airport with cleaner, quieter new generation equivalents.
- 7.3.3 The Airport is forecast to grow to its proposed passenger limit of 9 mppa by 2031 under the DC Scenario. Annual aircraft movements are forecast to increase from 83,963 in 2019 to 111,000 in 2031. This increase will incentivise the replacement of the most common aircraft at the Airport with quieter new generation equivalents.
- 7.3.4 In the 2031 DC Scenario the Airport is forecast to have reached 9 mppa, while aircraft movements will increase, noise exposure levels during the day are predicted to reduce due to the modernisation of the aircraft fleet, leading to a reduction in the number of people adversely affected by air noise. The number of people (excluding permitted developments) exposed to noise levels at or above the LOAEL reduces from 205,300 to 160,000. The 57 dB contour when the Airport reaches 9 mppa is forecast to reduce in area (to 7.2 km²), around 17% less than 2019 and around 20% less than the current contour area limit, 9.1 km². As a result, there would be around 14,000 less people exposed above the 57 dBL_{Aeq,16hr} contour.
- 7.3.5 In summary, due to the greater use of quieter, new generation aircraft by 2031 the number of people adversely affected by daytime noise is expected to reduce compared to 2019. Due to the proposed increase in early morning movements, which is not fully offset by the improvement in noise levels from the quieter new generation aircraft, night-time noise levels are forecast to increase by 2031 for the DC Scenario. There are 70 people in 20 properties on Camel Road (south of the western end of the runway) forecast to become exposed to night-time noise levels above the SOAEL. These people's dwellings have all already been treated by the high tier of the SIS and so, allowing for this sound insulation, good internal night-time noise levels should still arise. Due to the greater use of quieter new generation aircraft by 2031, weekend noise levels are expected to remain broadly similar to 2019 despite the extended operating hours and additional flights. More people are forecast to experience a decrease in weekend noise levels than are

forecast to experience an increase, with all of the changes in weekend noise forecast to be negligible.

2025 DM vs 2025 DC

- 7.3.6 In this section I summarise the assessment presented in the ES for 2025. Aircraft movements are forecast to be 78,500 in the 2025 DM Scenario compared to 83,000 in the 2025 DC Scenario. The fleet mixes for the two scenarios are broadly similar, but there are forecast to be a greater proportion of movements by the quieter new generation aircraft in the DC Scenario.
- 7.3.7 The absolute and relative impact ratings in the tables below and the resulting scale of effects are based on the criteria set out in Section 5 of my evidence.
- 7.3.8 The following Tables summarise how the Proposed Development will affect average summer daytime, night-time and weekend noise levels based on the absolute levels arising under the 2025 DC Scenario and the change in noise level compared to the 2025 DM Scenario that is experienced:
- Table 7.8 for Daytime Noise (dB $L_{Aeq,16hr}$) primary indicator
 - Table 7.9 for Night-time Noise (dB $L_{Aeq,8hr}$) primary indicator
 - Table 7.10 for Weekend Daytime Noise (dB $L_{Aeq,16hr}$) supplementary indicator

Table 7.8: Population Exposed to Absolute and Relative Air Noise Impacts, 2025 DC vs 2025 DM, Daytime

2025 DC Noise Level, dB $L_{Aeq,16hr}$	Absolute Impact	Population including Permitted Developments								
		Change in Noise Level DC vs DM, dB $L_{Aeq,16hr}$								
		Beneficial			Negligible			Adverse		
		High	Med	Low	Negligible			Low	Med	High
		≥6 dB	3 to 5.9	2 to 2.9	0.1 to 1.9	0 dB	0.1 to 1.9	2 to 2.9	3 to 5.9	≥6 dB
51 (LOAEL) to 62.9	Low	0	0	0	317,850	4,700	19,950	0	0	0
63 (SOAEL) to 68.9	Med	0	0	0	12,000	140	490	0	0	0
≥69 dB (UAEL)	High	0	0	0	0	0	0	0	0	0

KEY: Scale of effect	Not significant		Potential significant effect	
	Negligible	Minor	Moderate	Major

- 7.3.9 Overall, it can be seen that daytime noise exposure levels are predicted to remain broadly the same between the DM and DC Scenario, leading to no material change in the number of those people adversely affected by air noise. This is because while aircraft movements are higher under the 2025 DC Scenario, this is largely offset by the predicted additional modernisation of the aircraft fleet.
- 7.3.10 Compared to the DM Scenario, for the DC Scenario there are 3 fewer schools exposed to noise levels equal to or above the threshold level of 52 dB $L_{Aeq,16hr}$. There are the same number of residential healthcare buildings exposed to noise levels equal to or above the threshold level of 52 dB $L_{Aeq,16hr}$. There is 1 fewer outdoor amenity area exposed to noise levels equal to or above the threshold level of 55 dB $L_{Aeq,16hr}$. All of the changes in noise at these receptors are less than 3 dB, therefore the effects are rated as not significant.

Table 7.9: Population Exposed to Absolute and Relative Air Noise Impacts, 2025 DC vs 2025 DM, Night-time

2025 DC Noise Level, dB L _{Aeq,8hr}	Absolute Impact	Population including Permitted Developments								
		Change in Noise Level DC vs DM, dB L _{Aeq,8hr}								
		Beneficial			Negligible			Adverse		
		High	Med	Low	Negligible			Low	Med	High
		≥6 dB	3 to 5.9	2 to 2.9	0.1 to 1.9	0 dB	0.1 to 1.9	2 to 2.9	3 to 5.9	≥6 dB
45 (LOAEL) to 54.9	Low	0	0	0	0	0	53,200	25,400	0	0
55 (SOAEL) to 62.9	Med	0	0	0	0	0	0	0	0	0
≥63 dB (UAEL)	High	0	0	0	0	0	0	0	0	0

KEY: Scale of effect	Not significant		Potential significant effect	
	Negligible	Minor	Moderate	Major

7.3.11 Due to the proposed increase in the cap on night-time movements, noise exposure levels are predicted to be higher under the DC Scenario than the DM Scenario, leading to a higher number of people adversely affected by air noise at night.

7.3.12 Compared to the DM Scenario, for the DC Scenario the number of residential healthcare buildings exposed to noise levels equal to or above the threshold level of 50 dB L_{Aeq,1h} remains the same. All of the changes in noise at these receptors are less than 3 dB, therefore the effects are rated as not significant.

Table 7.10: Population Exposed to Absolute and Relative Air Noise Impacts, 2025 DC vs 2025 DM, Weekend

2025 DC Noise Level, dB L _{Aeq,16hr}	Absolute Impact	Population including Permitted Developments								
		Change in Noise Level DC vs DM, dB L _{Aeq,16hr}								
		Beneficial			Negligible			Adverse		
		High	Med	Low	Negligible			Low	Med	High
		≥6 dB	3 to 5.9	2 to 2.9	0.1 to 1.9	0 dB	0.1 to 1.9	2 to 2.9	3 to 5.9	≥6 dB
51 (LOAEL) to 62.9	Low	0	0	0	104,300	7,350	107,700	0	0	0
63 (SOAEL) to 68.9	Med	0	0	0	2,250	0	750	0	0	0
≥69 dB (UAEL)	High	0	0	0	0	0	0	0	0	0

KEY: Scale of effect	Not significant		Potential significant effect	
	Negligible	Minor	Moderate	Major

7.3.13 Overall, it can be seen that weekend noise exposure levels are predicted to remain broadly the same between the DM and DC Scenario, leading to no material change in the number of those people adversely affected by air noise. This is because while aircraft movements are higher under the 2025 DC Scenario, this is largely offset by the predicted additional modernisation of the aircraft fleet.

7.3.14 For both the DM and DC Scenarios, there are the same number of residential healthcare buildings exposed to noise levels equal to or above the threshold level of 52 dB $L_{Aeq,16hr}$ and the same number of outdoor amenity area exposed to noise levels equal to or above the threshold level of 55 dB $L_{Aeq,16hr}$. All of the changes in noise at these receptors are less than 3 dB, therefore the effects are rated as not significant.

2027 DM vs 2027 DC

7.3.15 In this section I summarise the noise effects forecast for 2027 in the ES. Annual aircraft movements are forecast to be 84,500 in the 2027 DM Scenario compared to 97,000 in the 2027 DC Scenario. There are forecast to be a much greater proportion of movements by the quieter new generation aircraft in the DC Scenario.

7.3.16 The following Tables summarise how the Proposed Development will affect average summer daytime, night-time and weekend noise levels based on the absolute levels arising under the 2027 DC Scenario and the change in noise level compared to the 2027 DM Scenario that is experienced:

- Table 7.11 for Daytime Noise (dB $L_{Aeq,16hr}$);
- Table 7.12 for Night-time Noise (dB $L_{Aeq,8hr}$); and
- Table 7.13 for Weekend Daytime Noise (dB $L_{Aeq,16hr}$).

Table 7.11: Population Exposed to Absolute and Relative Air Noise Impacts, 2027 DC vs 2027 DM, Daytime

2027 DC Noise Level, dB $L_{Aeq,16hr}$	Absolute Impact	Population including Permitted Developments								
		Change in Noise Level DC vs DM, dB $L_{Aeq,16hr}$								
		Beneficial			Negligible			Adverse		
		High	Med	Low	Negligible			Low	Med	High
		≥6 dB	3 to 5.9	2 to 2.9	0.1 to 1.9	0 dB	0.1 to 1.9	2 to 2.9	3 to 5.9	≥6 dB
51 (LOAEL) to 62.9	Low	0	0	39,050	237,100	180	1,150	0	0	0
63 (SOAEL) to 68.9	Med	0	0	0	7,350	0	0	0	0	0
≥69 dB (UAEL)	High	0	0	0	0	0	0	0	0	0

KEY: Scale of effect	Not significant		Potential significant effect	
	Negligible	Minor	Moderate	Major

7.3.17 Overall, it can be seen that daytime noise exposure levels are predicted to decrease between the DM and DC Scenarios, leading to a decrease in the number of those people adversely affected by air noise. This is because while aircraft movements are higher under the 2027 DC Scenario, this is more than offset by the predicted additional modernisation of the aircraft fleet.

7.3.18 Compared to the DM Scenario, for the DC Scenario there are 26 fewer schools exposed to noise levels equal to or above the threshold level of 52 dB $L_{Aeq,16hr}$. There are the same number of residential healthcare buildings exposed to noise levels equal to or above the threshold level of 52 dB $L_{Aeq,16hr}$. There are 48 fewer outdoor amenity areas exposed to noise levels equal to or above the threshold level of 55 dB $L_{Aeq,16hr}$. All of the changes in noise at these receptors are less than 3 dB, therefore the effects are rated as not significant.

Table 7.12: Population Exposed to Absolute and Relative Air Noise Impacts, 2027 DC vs 2027 DM, Night-time

2027 DC Noise Level, dB L _{Aeq,8hr}	Absolute Impact	Population including Permitted Developments								
		Change in Noise Level DC vs DM, dB L _{Aeq,8hr}								
		Beneficial					Adverse			
		High	Med	Low	Negligible			Low	Med	High
		≥6 dB	3 to 5.9	2 to 2.9	0.1 to 1.9	0 dB	0.1 to 1.9	2 to 2.9	3 to 5.9	≥6 dB
45 (LOAEL) to 54.9	Low	0	0	2,750	16,000	100	22,900	8,550	0	0
55 (SOAEL) to 62.9	Med	0	0	0	0	0	0	0	0	0
≥63 dB (UAEL)	High	0	0	0	0	0	0	0	0	0

KEY: Scale of effect	Not significant		Potential significant effect	
	Negligible	Minor	Moderate	Major

7.3.19 Overall, it can be seen that night-time noise exposure levels are predicted to remain similar between the DM and DC Scenarios, with a small increase in the number of those people adversely affected by air noise. This is because while aircraft movements are higher under the 2027 DC Scenario, this is largely offset by the predicted additional modernisation of the aircraft fleet.

7.3.20 Compared to the DM Scenario, for the DC Scenario there are the same number of residential healthcare buildings exposed to noise levels equal to or above the threshold level of 50 dB L_{Aeq,1h}. All of the changes in noise at these receptors are less than 3 dB, therefore the effects are rated as not significant.

Table 7.13: Population Exposed to Absolute and Relative Air Noise Impacts, 2027 DC Vs 2027 DM, Weekend

2027 DC Noise Level, dB L _{Aeq,16hr}	Absolute Impact	Population including Permitted Developments								
		Change in Noise Level DC vs DM, dB L _{Aeq,16hr}								
		Beneficial					Adverse			
		High	Medium	Low	Negligible			Low	Medium	High
		≥6 dB	3 to 5.9	2 to 2.9	0.1 to 1.9	0 dB	0.1 to 1.9	2 to 2.9	3 to 5.9	≥6 dB
51 (LOAEL) to 62.9	Low	0	0	0	161,900	250	14,800	0	0	0
63 (SOAEL) to 68.9	Med	0	0	0	1,500	0	0	0	0	0
≥69 dB (UAEL)	High	0	0	0	0	0	0	0	0	0

KEY: Scale of effect	Not significant		Potential significant effect	
	Negligible	Minor	Moderate	Major

7.3.21 Overall, it can be seen that weekend noise exposure levels are predicted to decrease between the DM and DC Scenarios, leading to a decrease in the number of those people adversely affected by air noise. This is because while aircraft movements are higher under the 2027 DC Scenario, this is more than offset by the predicted additional modernisation of the aircraft fleet.

7.3.22 Compared to the DM Scenario, for the DC Scenario there are the same number of residential healthcare buildings exposed to noise levels equal to or above the threshold level of 52 dB $L_{Aeq,16hr}$. There are 3 fewer outdoor amenity areas exposed to noise levels equal to or above the threshold level of 55 dB $L_{Aeq,16hr}$. All of the changes in noise at these receptors are less than 3 dB, therefore the effects are rated as not significant.

2031 DM vs 2031 DC

7.3.23 In this section I summarise the noise effects forecast for 2031 in the ES (CD1.15). Annual aircraft movements are forecast to be 94,000 in the 2031 DM Scenario compared to 111,000 in the 2031 DC Scenario. There are forecast to be a greater proportion of movements by the quieter new generation aircraft in the DC Scenario.

7.3.24 The following Tables summarise how the Proposed Development will affect average summer daytime, night-time and weekend noise levels based on the absolute levels arising under the 2031 DC Scenario and the change in noise level compared to the 2031 DM Scenario that is experienced:

- Table 7.14 for Daytime Noise (dB $L_{Aeq,16hr}$);
- Table 7.15 for Night-time Noise (dB $L_{Aeq,8hr}$); and
- Table 7.16 for Weekend Daytime Noise (dB $L_{Aeq,16hr}$).

Table 7.14: Population Exposed to Absolute and Relative Air Noise Impacts, 2031 DC Vs 2031 DM, Daytime

2031 DC Noise Level, dB $L_{Aeq,16hr}$	Absolute Impact	Population including Permitted Developments								
		Change in Noise Level DC vs DM, dB $L_{Aeq,16hr}$								
		Beneficial			Negligible			Adverse		
		High	Med	Low	Negligible			Low	Med	High
		≥6 dB	3 to 5.9	2 to 2.9	0.1 to 1.9	0 dB	0.1 to 1.9	2 to 2.9	3 to 5.9	≥6 dB
51 (LOAEL) to 62.9	Low	0	0	0	5,900	480	287,250	0	0	0
63 (SOAEL) to 68.9	Med	0	0	0	0	0	8,600	0	0	0
≥69 dB (UAEL)	High	0	0	0	0	0	0	0	0	0

KEY: Scale of effect	Not significant		Potential significant effect	
	Negligible	Minor	Moderate	Major

7.3.25 Overall, it can be seen that due to the greater number of aircraft movements in the 2031 DC Scenario, daytime noise exposure levels are predicted to increase, leading to an increase in the number of those people adversely affected by air noise. This is however largely offset by the predicted additional modernisation of the aircraft fleet.

7.3.26 Compared to the DM Scenario, for the DC Scenario there are 2 more schools exposed to noise levels equal to or above the threshold level of 52 dB $L_{Aeq,16hr}$. There are the same number of

residential healthcare buildings exposed to noise levels equal to or above the threshold level of 52 dB $L_{Aeq,16hr}$. There are 6 more outdoor amenity areas exposed to noise levels equal to or above the threshold level of 55 dB $L_{Aeq,16hr}$. All of the changes in noise at these receptors are less than 3 dB, therefore the effects are rated as not significant.

Table 7.15: Population Exposed to Absolute and Relative Air Noise Impacts, 2031 DC Vs 2031 DM, Night-time

2031 DC Noise Level, dB $L_{Aeq,8hr}$	Absolute Impact	Population including Permitted Developments								
		Change in Noise Level DC vs DM, dB $L_{Aeq,8hr}$								
		Beneficial			Negligible			Adverse		
		High	Med	Low	Negligible			Low	Med	High
		≥6 dB	3 to 5.9	2 to 2.9	0.1 to 1.9	0 dB	0.1 to 1.9	2 to 2.9	3 to 5.9	≥6 dB
45 (LOAEL) to 54.9	Low	0	0	2,750	16,700	90	26,800	8,850	0	0
55 (SOAEL) to 62.9	Medium	0	0	0	0	0	70	0	0	0
≥63 dB (UAE)	High	0	0	0	0	0	0	0	0	0

KEY: Scale of effect	Not significant		Potential significant effect	
	Negligible	Minor	Moderate	Major

7.3.27 Overall, night-time noise exposure levels are predicted to remain similar between the DM and DC Scenarios, with a slight decrease in the total number of those people adversely affected by air noise. This is because while aircraft movements are higher under the 2031 DC Scenario, this is offset by the predicted additional modernisation of the aircraft fleet.

7.3.28 Compared to the DM Scenario, for the DC Scenario there are the same number of residential healthcare buildings exposed to noise levels equal to or above the threshold level of 50 dB $L_{Aeq,1h}$. All of the changes in noise at these receptors are less than 3 dB, therefore the effects are rated as not significant.

Table 7.16: Population Exposed to Absolute and Relative Air Noise Impacts, 2031 DC Vs 2031 DM, Weekend

2031 DC Noise Level, dB $L_{Aeq,16hr}$	Absolute Impact	Population including Permitted Developments								
		Change in Noise Level DC vs DM, dB $L_{Aeq,16hr}$								
		Beneficial			Negligible			Adverse		
		High	Med	Low	Negligible			Low	Med	High
		≥6 dB	3 to 5.9	2 to 2.9	0.1 to 1.9	0 dB	0.1 to 1.9	2 to 2.9	3 to 5.9	≥6 dB
51 (LOAEL) to 62.9	Low	0	0	0	0	0	196,550	0	0	0
63 (SOAEL) to 68.9	Med	0	0	0	0	0	3,400	0	0	0
≥69 dB (UAE)	High	0	0	0	0	0	0	0	0	0

KEY: Scale of effect	Not significant		Potential significant effect	
	Negligible	Minor	Moderate	Major

- 7.3.29 Overall, noise exposure levels are predicted to increase between the DM and DC Scenario, leading to an increase in the number of those people adversely affected by air noise. This is because aircraft movements are higher under the 2031 DC Scenario and this is not fully offset by the predicted additional modernisation of the aircraft fleet.
- 7.3.30 Compared to the DM Scenario, for the DC Scenario there are the same number of residential healthcare buildings exposed to noise levels equal to or above the threshold level of 52 dB $L_{Aeq,16hr}$. There are 18 more outdoor amenity areas exposed to noise levels equal to or above the threshold level of 55 dB $L_{Aeq,16hr}$. All of the changes in noise at these receptors are less than 3 dB, therefore the effects are rated as not significant.
- 7.3.31 In summary, the air noise effects under the DC Scenario are generally greater than under the DM Scenario. The number of people adversely affected by daytime and weekend noise is higher under the DC Scenario. The number of people adversely affected by night-time noise is broadly similar between the DM and DC Scenarios. All changes in daytime and weekend noise levels are rated as negligible and would therefore result in a negligible effect. In the night-time some people forecast to experience a minor beneficial or minor adverse effect under the DC Scenario. Around 80% of those within the LOAEL and all those within the SOAEL are forecast to experience a negligible effect.
- 7.3.32 As all of those forecast to be affected by daytime or weekend aircraft noise are forecast to experience a negligible effect and nobody is forecast to experience a significant effect the overall effect rating for each period is negligible. Around 80% of those forecast to be affected by night-time aircraft noise in 2031 are forecast to experience a negligible effect and nobody is forecast to experience a significant effect; more people are forecast to experience a minor adverse effect than a minor beneficial effect, therefore the overall effect rating for night-time is negligible to minor adverse.

Comparison with Findings of the 2015 UES

- 7.3.33 The daytime air noise LOAEL for this assessment is 51 dB $L_{Aeq,16hr}$. 51 dB contours were not prepared as part of the 2015 UES. The comparisons below therefore focus on the 57 dB contour and the 63 dB (SOAEL) contour. Table 7.17 shows the areas of the 2025 contours from the 2015 UES and the 2025 DC and 2031 DC contours from this assessment.

Table 7.17: Summer Daytime Noise Contour Area

Noise Contour, dB $L_{Aeq,16hr}$	Noise Contour Area, km ²			
	2015 UES 2025 Without Dev.	2015 UES 2025 With Dev.	2025 DC	2031 DC
57	8.4	9.0	8.5	7.2
63 (SOAEL)	2.2	2.4	2.2	1.9

- 7.3.34 The areas of the 57 dB daytime 2025 and 2031 contours for the DC Scenario are below the contour area limit of 9.1 km² and are forecast to reduce by 2031, when the Airport is forecast to reach 9 mppa in the Core Case, by 17% compared to 2019 and by 20% compared to the current contour area limit. This shows the proposals are consistent with the APF policy of “sharing the benefits” of the quieter new generation aircraft and that the overall noise under the DC Scenario is less than that permitted under the CADP1 permission.
- 7.3.35 Table 7.17 shows that the forecast noise contours for the 2025 DC Scenario are smaller than those forecast in the With Development Scenario in the 2015 UES and similar in area to the

Without Development Scenario. The 2031 DC contours are smaller than both the With and Without Development contours in the 2015 UES. This suggests that in 2025 summer daytime noise will be less overall than forecast for 2025 With Development in the 2015 UES and similar to that forecast without development. By 2031 with the Proposed Development the daytime noise will be less than assessed Without Development in the 2015 UES. This suggests the summer daytime air noise effects of the Proposed Development are less than those assessed in the 2015 UES.

- 7.3.36 Table 7.18 and Table 7.19 show the number of people excluding and including permitted developments respectively within the 2025 noise contours in the 2015 UES and the 2025 DC and 2031 DC contours in this assessment.

Table 7.18: Air Noise Population Counts, $L_{Aeq,16hr}$ Average Mode Summer Day

Noise Contour, dB $L_{Aeq,16hr}$	Population excluding Permitted Developments			
	CADP1 2025 Without Dev.	CADP1 2025 With Dev.	2025 DC	2031DC
57	35,600	39,600	49,050	37,550
63 (SOAEL)	2,600	2,900	2,550	2,550

Table 7.19: Air Noise Population Counts, $L_{Aeq,16hr}$ Average Mode Summer Day

Noise Contour, dB $L_{Aeq,16hr}$	Population including Permitted Developments ⁹			
	CADP1 2025 Without Dev.	CADP1 2025 With Dev.	2025 DC	2031 DC
57	70,900	76,800	106,550	81,050
63 (SOAEL)	11,500	12,050	12,650	8,600

- 7.3.37 The number of people living near the Airport has increased since the time of the 2015 UES. This means in some cases there are more people within the noise contours, even where the noise contours are smaller than those forecast in 2015 UES. It was expected that population around the Airport would increase, which is why the 2015 UES assessed the number of people including and excluding permitted developments at the time. In the time since the 2015 UES many of these permitted developments have been built, and further developments proposed.
- 7.3.38 The number of people forecast to be within 2025 DC noise contours based on the latest population data is between that forecast based on 2015 data in the 2015 UES and that based on 2015 data including the 2015 permitted developments. This shows that the summer daytime air noise effects of the Proposed Development are within the range assessed in the 2015 UES. The number of people within the 2031 DC noise contours is similar to that for the 2025 noise contours excluding permitted developments in the 2015 UES, despite the increase in the population around the Airport.
- 7.3.39 Given the 2031 DC summer daytime air noise contours are smaller than those assessed in the 2015 UES and the number of people within those contours excluding permitted developments is within the range presented in the 2015 UES, the effects of the Proposed Development are not considered likely to result in materially different long term daytime air noise effects.

⁹ For the CADP1 results the permitted developments relate to the permitted development assessment carried out in 2014 for the UES. For the DC Scenario results the permitted development relates to the latest assessment carried out in 2022 for this ES.

- 7.3.40 It is not possible to compare the predicted night-time and weekend effects of the Proposed Development with those of the approved CADP1 scheme as no changes were proposed to the night-time or weekend periods as part of the original CADP1 application and accordingly no detailed assessment was undertaken in 2015 UES. The effects of the Proposed Development in 2031 are therefore new effects in addition to those previously identified, however in 2031 they have been assessed as negligible for the weekend and negligible to minor adverse for the night-time and not significant.
- 7.3.41 The noise assessment in Chapter 8 of the ES (CD1.15) has shown that there are no new or materially different significant operational air noise effects due to the Proposed Amendments.

7.4 Predicted Ground Noise Effects and their Significance

- 7.4.1 This section sets out the ground noise effects arising from the Proposed Development by comparing the results of the DM Scenario to those of the DC Scenario. A subjective account of how noise conditions will change between 2019 (the baseline year) and the 2031 DM and DC Scenarios has also been included to provide context. To summarise, the assessment of effects is based on a comparison of the following key scenarios:
- 2019 vs 2031 DM and 2031 DC;
 - 2025 DM vs 2025 DC;
 - 2027 DM vs 2027 DC; and
 - 2031 DM vs 2031 DC.

- 7.4.2 In this section I summarise the ground noise effects arising from the Proposed Development. Chapter 8 (CD1.15) and Appendix 8.4 (CD1.40) of the ES provides the further details of the ground noise assessment.

2019 (Baseline Year) vs 2031 DM and DC Scenarios

- 7.4.3 The Airport is forecast to grow to its current passenger limit of 6.5 mppa by 2031 under the DM Scenario. Annual aircraft movements are forecast to increase from 83,963 in 2019 to 94,000 in 2031. The Airport is forecast to grow to its proposed passenger limit of 9 mppa by 2031 under the DC Scenario. Annual aircraft movements are forecast to increase from 83,963 in 2019 to 111,000 in 2031.
- 7.4.4 The increase in both scenarios will be accompanied by the replacement of many of the most common aircraft at the Airport with new generation equivalents. These new generation aircraft will need to use the larger code-c stands due to their greater wingspan. Most of these stands are on the eastern apron. This will mean greater use of these stands as the fleet transition progresses and correspondingly less usage of the main and west apron stands.
- 7.4.5 The forecast increase in movements and greater use of the eastern stands will result in overall increases in daytime, night-time and weekend noise levels for areas to the east of the Airport under the DM Scenario. For areas to the west of the Airport noise levels are expected to remain similar or in some cases reduce slightly, due to the reduction in use of the main and west apron stands.
- 7.4.6 By 2031 under the DC Scenario construction of the remaining elements of CADP1 is expected to have been completed. These will provide additional screening for many residents to the south of the Airport; for instance, locations to the south of the new eastern apron will benefit from the construction of the eastern pier extension and the permanent noise barrier, both of which are

taller than the temporary noise barrier currently in place. This additional height will result in reductions in noise for most residents in these areas.

- 7.4.7 For areas to the north and east of the Airport, which largely do not benefit from the additional screening, there are forecast to be increases in daytime ground noise, this is partly due to the increases in aircraft movements and partly due to the greater use of the eastern stands due to the transition to new generation aircraft. Airborne aircraft noise, assessed in the air noise section, will also be higher than the ground noise levels in many areas. Those above the LOAEL will generally already have been offered treatment by the Airport's SIS or the Construction Sound Insulation Scheme or "CSIS" (introduced as part of the CADP1 permission) or have been required to be built with a high level of sound insulation by planning condition.

2025 DM vs 2025 DC

- 7.4.8 This section summarises the noise effects forecast for 2025. Annual aircraft movements are forecast to be 78,500 in the 2025 DM Scenario compared to 83,000 in the 2025 DC Scenario. The fleet mix for the two scenarios are broadly similar, but there are forecast to be a slightly greater proportion of movements by the quieter new generation aircraft in the DC Scenario, resulting in a slightly greater use of the eastern apron stands.
- 7.4.9 The absolute and relative impact ratings in the tables below and the resulting scale of effects are based on the criteria set out in Section 5 of my evidence.
- 7.4.10 The following Tables summarise how the Proposed Development will affect average summer daytime, night-time and weekend noise levels based on the absolute levels arising under the 2025 DC Scenario and the change in noise level compared to the 2025 DM Scenario that is experienced:
- Table 7.20 for Daytime Noise (dB L_{Aeq,16hr});
 - Table 7.21 for Night-time Noise (dB L_{Aeq,8hr}); and
 - Table 7.22 for Weekend Noise (dB L_{Aeq,16hr}).

Table 7.20: Receptors Exposed to Absolute and Relative Ground Noise Impacts, 2025 DC Vs 2025 DM, Daytime

2025 DC Noise Level, dB L _{Aeq,16hr}	Absolute Impact	Receptors								
		Change in Noise Level DC vs DM, dB L _{Aeq,16hr}								
		Beneficial			Adverse					
		High	Med	Low	Negligible			Low	Med	High
		≥6 dB	3 to 5.9	2 to 2.9	0.1 to 1.9	0 dB	0.1 to 1.9	2 to 2.9	3 to 5.9	≥6 dB
50 (LOAEL) to 59.9	Low	0	0	0	75	8	603	0	0	0
60 (SOAEL) to 69.9	Med	0	0	0	3	1	1	0	0	0
≥ 70 dB (UAEL)	High	0	0	0	0	0	0	0	0	0

KEY: Scale of effect	Not significant		Potential significant effect	
	Negligible	Minor	Moderate	Major

7.4.11 Overall, between the DM and DC Scenario, there is no material change in the number of those people adversely affected by daytime ground noise. The number of receptors exposed to daytime noise levels at or above the LOAEL (low absolute impact) increases slightly from 633 under the DM Scenario to 686 under the DC Scenario. The number of receptors exposed to daytime noise levels at or above the SOAEL (medium absolute impact) remains similar, specifically there are 4 for the DM Scenario and 5 for the DC Scenario. No receptors are exposed to noise levels with an absolute impact rated as high (above the UAEL). No non-residential receptors are affected.

7.4.12 The daytime ground noise effects in 2025 are therefore rated as a negligible effect overall.

Table 7.21: Receptors Exposed to Absolute and Relative Ground Noise Impacts, 2025 DC vs 2025 DM, Night-time

2025 DC Noise Level, dB L _{Aeq,8hr}	Absolute Impact	Receptors								
		Change in Noise Level DC vs DM, dB L _{Aeq,8hr}								
		Beneficial			Negligible			Adverse		
		High	Med	Low	Negligible			Low	Med	High
		≥6 dB	3 to 5.9	2 to 2.9	0.1 to 1.9	0 dB	0.1 to 1.9	2 to 2.9	3 to 5.9	≥6 dB
45 (LOAEL) to 54.9	Low	0	0	0	0	0	19	81	0	0
55 (SOAEL) to 64.9	Medium	0	0	0	0	0	0	0	0	0
≥ 65 dB (UAEL)	High	0	0	0	0	0	0	0	0	0

KEY: Scale of effect	Not significant		Potential significant effect	
	Negligible	Minor	Moderate	Major

7.4.13 Overall, between the DM and DC Scenario, there is no material change in the number of those people adversely affected by night-time ground noise. While the number of receptors exposed to night-time noise levels at or above the LOAEL (low absolute impact) increases from 12 under the DM Scenario to 100 under the DC Scenario the large majority remain below the LOAEL. No receptors are exposed to noise levels at or above the SOAEL (medium absolute impact) or at or above the UAEL (high absolute impact). No non-residential receptors are affected.

7.4.14 The night-time ground noise effects in 2025 are therefore rated as a negligible effect overall

Table 7.22: Population Exposed to Absolute and Relative Ground Noise Impacts, 2025 DC vs 2025 DM, Weekend

2025 DC Noise Level, dB L _{Aeq,16hr}	Absolute Impact	Receptors								
		Change in Noise Level DC vs DM, dB L _{Aeq,16hr}								
		Beneficial			Adverse					
		High	Med	Low	Negligible		Low	Med	High	
		≥6 dB	3 to 5.9	2 to 2.9	0.1 to 1.9	0 dB	0.1 to 1.9	2 to 2.9	3 to 5.9	≥6 dB
50 (LOAEL) to 59.9	Low	0	0	0	0	3	356	0	0	0
60 (SOAEL) to 69.9	Medium	0	0	0	0	0	1	0	0	0
≥ 70 dB (UAEL)	High	0	0	0	0	0	0	0	0	0

KEY: Scale of effect	Not significant		Potential significant effect	
	Negligible	Minor	Moderate	Major

7.4.15 Overall, between the DM and DC Scenario there is no material change in the number of those people adversely affected by weekend ground noise. The number of receptors exposed to weekend noise levels at or above the LOAEL (low absolute impact) increases slightly from 301 under the DM Scenario to 359 under the DC Scenario. The number of receptors exposed to weekend noise levels at or above the SOAEL (medium absolute impact) remains the same at 1 for both the DM and DC Scenarios. No receptors are exposed to noise levels at or above the UAEL (high absolute impact). No non-residential receptors are affected.

7.4.16 The weekend ground noise effects in 2025 are therefore rated as a negligible effect overall.

2027 DM vs 2027 DC

7.4.17 This section summarises the noise effects forecast for 2027. Annual aircraft movements are forecast to be 84,500 in the 2027 DM Scenario compared to 97,000 in the 2027 DC Scenario. There are forecast to be a much greater proportion of movements by the quieter new generation aircraft in the DC Scenario, resulting in an increase in the use of the eastern apron stands and corresponding decreases in the use of the main and western apron stands. By 2027 under the DC Scenario some elements of the remaining CADP1 infrastructure are expected to have been built, such as the first stage of the new east pier. These additional buildings result in extra screening for some areas to the south of the Airport, leading to reductions in noise for residents in these areas.

7.4.18 The following tables summarise how the Proposed Development will affect average summer daytime, night-time and weekend noise levels based on the absolute levels arising under the 2027 DC Scenario and the change in noise level compared to the 2027 DM Scenario that is experienced:

- Table 7.23 for Daytime Noise (dB L_{Aeq,16hr});
- Table 7.24 for Night-time Noise (dB L_{Aeq,8hr}); and
- Table 7.25 for Weekend Daytime Noise (dB L_{Aeq,16hr}).

Table 7.23: Receptors Exposed to Absolute and Relative Ground Noise Impacts, 2027 DC vs 2027 DM, Daytime

2027 DC Noise Level, dB L _{Aeq,16hr}	Absolute Impact	Receptors								
		Change in Noise Level DC vs DM, dB L _{Aeq,16hr}								
		Beneficial			Negligible			Adverse		
		High	Med	Low	Negligible			Low	Med	High
		≥6	3 to 5.9	2 to 2.9	0.1 to 1.9	0	0.1 to 1.9	2 to 2.9	3 to 5.9	≥6
50 (LOAEL) to 59.9	Low	0	0	24	65	0	501	174	34	0
60 (SOAEL) to 69.9	Medium	0	0	0	1	0	22	1	0	0
≥ 70 dB (UAEI)	High	0	0	0	0	0	0	0	0	0

KEY: Scale of effect	Not significant		Potential significant effect	
	Negligible	Minor	Moderate	Major

7.4.19 Overall, daytime noise exposure levels are predicted to increase slightly between the DM and DC Scenario. The number of receptors exposed to daytime noise levels at or above the LOAEL (low absolute impact) increases from 662 under the DM Scenario to 798 under the DC Scenario. The number of receptors exposed to daytime noise levels at or above the SOAEL (medium absolute impact) increases from 5 under the DM to 24 under the DC Scenario. No receptors are exposed to noise levels with an absolute impact rated as high (above the UAEI).

7.4.20 35 receptors are forecast to experience a potentially significant moderate adverse effect. 16 of these are student dorms in the University of East London (UEL) accommodation buildings. The buildings were specifically designed to have a very good level of sound insulation due to their proximity to the Airport. The other 19 receptors are within the Airport's air noise sound insulation contours and therefore have already been treated or offered treatment by the air noise SIS or been treated under the CSIS.

7.4.21 The daytime ground noise effects in 2027 are therefore rated as a negligible effect overall.

Table 7.24: Receptors Exposed to Absolute and Relative Ground Noise Impacts, 2027 DC vs 2027 DM, Night-time

2027 DC Noise Level, dB L _{Aeq,8hr}	Absolute Impact	Receptors								
		Change in Noise Level DC vs DM, dB L _{Aeq,8hr}								
		Beneficial			Negligible			Adverse		
		High	Med	Low	Negligible			Low	Med	High
		≥6 dB	3 to 5.9	2 to 2.9	0.1 to 1.9	0 dB	0.1 to 1.9	2 to 2.9	3 to 5.9	≥6 dB
45 (LOAEL) to 54.9	Low	0	0	0	5	0	0	0	162	0
55 (SOAEL) to 64.9	Medium	0	0	0	0	0	0	0	0	0
≥ 65 dB (UAEI)	High	0	0	0	0	0	0	0	0	0

KEY: Scale of effect	Not significant		Potential significant effect	
	Negligible	Minor	Moderate	Major

	Negligible	Minor	Moderate	Major
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- 7.4.22 Overall, between the DM and DC Scenario there is slight increase in the number of those people adversely affected by night-time ground noise although the majority remain below the LOAEL. The number of receptors exposed to night-time noise levels at or above the LOAEL (low absolute impact) increases from 13 under the DM Scenario to 167 under the DC Scenario. No receptors are exposed to noise levels at or above the SOAEL (medium absolute impact) or at or above the UAEL (high absolute impact).
- 7.4.23 Based on the absolute levels for the DC Scenario and the changes in noise comparing the DC and DM Scenarios, the night-time noise effects are rated as negligible for over 90% of receptors in the study area. 162 receptors are forecast to experience a potentially significant moderate adverse effect. 157 of these are student dorms in the UEL accommodation buildings. These buildings were specifically designed to have a very good level of sound insulation due to their proximity to the Airport. The other 5 receptors have been treated under the CSIS.
- 7.4.24 The night-time ground noise effects in 2027 are rated as a negligible to minor adverse effect overall.

Table 7.25: Receptors Exposed to Absolute and Relative Ground Noise Impacts, 2027 DC vs 2027 DM, Weekend

2027 DC Noise Level, dB LAeq,16hr	Absolute Impact	Receptors								
		Change in Noise Level DC vs DM, dB LAeq,16hr								
		Beneficial			Adverse					
		High	Med	Low	Negligible		Low	Med	High	
		≥6 dB	3 to 5.9	2 to 2.9	0.1 to 1.9	0 dB	0.1 to 1.9	2 to 2.9	3 to 5.9	≥6 dB
50 (LOAEL) to 59.9	Low	0	0	0	43	1	7	330	124	0
60 (SOAEL) to 69.9	Medium	0	0	0	1	0	0	0	0	0
≥ 70 dB (UAEL)	High	0	0	0	0	0	0	0	0	0

KEY: Scale of effect	Not significant		Potential significant effect	
	Negligible	Minor	Moderate	Major

- 7.4.25 Overall, between the DM and DC Scenario there is a slight increase in number of those people adversely affected by weekend ground noise. The number of receptors exposed to weekend noise levels at or above the LOAEL (low absolute impact) increases from 316 under the DM Scenario to 505 under the DC Scenario. The number of receptors exposed to weekend noise levels at or above the SOAEL (medium absolute impact) remains the same at 1 for both the DM and DC Scenarios. No receptors are exposed to noise levels at or above the UAEL (high absolute impact).
- 7.4.26 Based on the absolute levels for the DC Scenario and the changes in noise comparing the DC and DM Scenarios, the weekend noise effects are rated as negligible for over 80% of receptors. There are 330 receptors forecast to experience a potential minor adverse effect. 124 receptors are forecast to experience a potentially significant moderate adverse effect. 52 of these are student dorms in the UEL accommodation buildings. These buildings were specifically designed to have a very good level of sound insulation due to their proximity to the Airport. The other 72

receptors are within the Airport's air noise sound insulation contours and have already been treated or offered treatment under the air noise SIS or have been treated under the CSIS.

7.4.27 The weekend ground noise effects in 2027 are rated as a negligible to minor adverse effect overall.

2031 DM vs 2031 DC

7.4.28 Annual aircraft movements are forecast to be 94,000 in the 2031 DM Scenario compared to 111,000 in the 2031 DC Scenario. There are forecast to be a slightly greater proportion of movements by the quieter new generation aircraft in the DC Scenario, resulting in an increase in the use of the eastern apron stands and corresponding decreases in the use of the main and western apron stands.

7.4.29 By 2031 under the DC Scenario, all remaining elements of the CADP1 infrastructure are expected to have been built. These additional buildings result in extra screening for some areas to the south of the Airport, leading to reductions in noise for residents in these areas.

7.4.30 In 2031 the jet centre is forecast to no longer be in use under the DC Scenario or may only have a small number of movements. When not in use for jet centre aircraft, the jet centre apron may instead be used as a stand for commercial aircraft. This has been allowed for in the modelling of the DC Scenario.

7.4.31 The following Tables summarise how the Proposed Development will affect average summer daytime, night-time and weekend noise levels based on the absolute levels arising under the 2031 DC Scenario and the change in noise level compared to the 2031 DM Scenario that is experienced:

- Table 7.26 for Daytime Noise (dB L_{Aeq,16hr});
- Table 7.27 for Night-time Noise (dB L_{Aeq,8hr}); and
- Table 7.28 for Weekend Daytime Noise (dB L_{Aeq,16hr}).

Table 7.26: Receptors Exposed to Absolute and Relative Ground Noise Impacts, 2031 DC vs 2031 DM, Daytime

2031 DC Noise Level, dB L _{Aeq,16hr}	Absolute Impact	Receptors								
		Change in Noise Level DC vs DM, dB L _{Aeq,16hr}								
		Beneficial			Negligible			Adverse		
		High	Med	Low	Negligible			Low	Med	High
		≥6	3 to 5.9	2 to 2.9	0.1 to 1.9	0	0.1 to 1.9	2 to 2.9	3 to 5.9	≥6
50 (LOAEL) to 59.9	Low	0	2	9	60	25	695	7	11	0
60 (SOAEL) to 69.9	Medium	0	0	0	0	0	48	0	0	0
≥ 70 dB (UAEI)	High	0	0	0	0	0	0	0	0	0

KEY: Scale of effect	Not significant		Potential significant effect	
	Negligible	Minor	Moderate	Major

7.4.32 Based on the absolute levels for the DC Scenario and the changes in noise comparing the DC and DM Scenarios, the daytime noise effects are rated as negligible for over 90% of receptors.

There are 142 receptors forecast to experience a potential minor beneficial effect and 7 receptors forecast to experience a potential minor adverse effect. 2 receptors are forecast to experience a potentially significant moderate beneficial effect. 11 receptors are forecast to experience a potentially significant moderate adverse effect. All of these buildings are within the Airport's air noise sound insulation contours and therefore have already been treated or offered treatment under the air noise SIS or have been treated under the CSIS.

7.4.33 The daytime ground noise effects in 2031 are rated as a negligible effect overall.

Table 7.27: Receptors Exposed to Absolute and Relative Ground Noise Impacts, 2031 DC vs 2031 DM, Night-time

2031 DC Noise Level, dB L _{Aeq,8hr}	Absolute Impact	Receptors								
		Change in Noise Level DC vs DM, dB L _{Aeq,8hr}								
		Beneficial			Adverse					
		High	Med	Low	Negligible		Low	Med	High	
		≥6	3 to 5.9	2 to 2.9	0.1 to 1.9	0	0.1 to 1.9	2 to 2.9	3 to 5.9	≥6
45 (LOAEL) to 54.9	Low	0	0	0	0	0	1	9	217	0
55 (SOAEL) to 64.9	Medium	0	0	0	0	0	0	0	0	0
≥ 65 dB (UAEL)	High	0	0	0	0	0	0	0	0	0

KEY: Scale of effect	Not significant		Potential significant effect	
	Negligible	Minor	Moderate	Major

7.4.34 Based on the absolute levels for the DC Scenario and the changes in noise comparing the DC and DM Scenarios, the night-time noise effects are rated as negligible for over 90% of receptors. There are 63 receptors forecast to experience a potential minor beneficial effect and 18 receptors forecast to experience a potential minor adverse effect. 217 receptors are forecast to experience a potentially significant moderate adverse effect. 215 of these are student dorms in the UEL accommodation buildings. These buildings were specifically designed to have a very good level of sound insulation due to their proximity to the Airport. The other 2 receptors are within the Airport's air noise sound insulation contours and therefore have already been treated or offered treatment by the air noise SIS.

7.4.35 The night-time ground noise effects in 2031 are rated as a negligible to minor adverse effect overall.

Table 7.28: Receptors Exposed to Absolute and Relative Ground Noise Impacts, 2031 DC vs 2031 DM, Weekend

2031 DC Noise Level, dB L _{Aeq,16hr}	Absolute Impact	Receptors								
		Change in Noise Level DC vs DM, dB L _{Aeq,16hr}								
		Beneficial			Negligible			Adverse		
		High	Med	Low	Negligible			Low	Med	High
		≥6	3 to 5.9	2 to 2.9	0.1 to 1.9	0	0.1 to 1.9	2 to 2.9	3 to 5.9	≥6
50 (LOAEL) to 59.9	Low	0	0	1	15	1	110	432	17	0
60 (SOAEL) to 69.9	Medium	0	0	0	0	0	1	5	0	0
≥ 70 dB (UAEL)	High	0	0	0	0	0	0	0	0	0

KEY: Scale of effect	Not significant		Potential significant effect	
	Negligible	Minor	Moderate	Major

7.4.36 Based on the absolute levels for the DC Scenario and the changes in noise comparing the DC and DM Scenarios, the weekend noise effects are rated as negligible for over 80% of receptors. There are 65 receptors forecast to experience a potential minor beneficial effect and 434 receptors forecast to experience a potential minor adverse effect. 22 receptors are forecast to experience a potentially significant moderate adverse effect. 12 of these are student dorms in the UEL accommodation buildings. These buildings were specifically designed to have a very good level of sound insulation due to their proximity to the Airport. The other 10 receptors are within the Airport's air noise sound insulation contours and therefore have already been treated or offered treatment by the air noise SIS or have been treated under the CSIS.

7.4.37 The weekend ground noise effects in 2031 are rated as a negligible to minor adverse effect overall.

Comparison with Findings of the 2015 UES

7.4.38 The CadnaA noise model used to predict the ground noise levels has been updated since the 2015 UES. There are a greater number of receptors in the latest model, primarily due to newly built developments since the time of the 2015 UES and also partly due to an expansion of the study area considered. Due to the greater number of receptors in the model, the absolute number of receptors exposed to a particular predicted effect cannot be directly compared with the numbers in the 2015 UES.

7.4.39 The 2015 UES predicted that 1.9% of receptors were exposed to daytime ground noise levels above the SOAEL and that this would increase by a further 1.8% with the CADP1 development of receptors to a total of 3.7%. The assessment in the ES for the S73 Application predicts that in the daytime and the weekend less than 1% of receptors will be exposed to noise levels above the SOAEL in 2031 for the DC Scenario. In the night-time no receptors are forecast to be exposed to noise levels above the SOAEL.

7.4.40 Overall, this suggests that noise effects of the Proposed Development are similar to or slightly less than the effects predicted for CADP1 in the 2015 UES. All of the small number of receptors predicted to experience a potentially significant moderate increase in ground noise in the daytime, night-time or weekend are either already treated by or eligible for treatment by the

Airport's air noise SIS or the CSIS or were required to be built with a very good standard of sound insulation by planning condition due to their proximity to the Airport.

- 7.4.41 The noise assessment in Chapter 8 of the ES (CD1.15) has shown that there are no new or materially different significant operational noise effects due to ground noise from the Proposed Development.

7.5 Road traffic noise

- 7.5.1 There is no disagreement between the Appellant and LBN regarding the assessment of road traffic noise associated with the Proposed Amendments as reported in the Environmental Statement.
- 7.5.2 For completeness, the assessment of road traffic noise is reported in Chapter 8 of the ES (CD1.15), specifically Section 8.3 (indices and significance criteria), Section 8.6 (assessment of effects) and Section 8.8 (residual effects and conclusions).

7.6 Construction noise

- 7.6.1 There is no disagreement between the Appellant and LBN regarding the assessment of construction noise associated with the Development Case as reported in the Environmental Statement.
- 7.6.2 For completeness, the assessment of construction noise is reported in Chapter 8 of the ES (CD1.15), specifically Section 8.3 (indices and significance criteria), Section 8.6 (assessment of effects) and Section 8.8 (residual effects and conclusions).

8. Assessment of effects: Sensitivity tests

8.1 Faster and Slower Growth Cases

- 8.1.1 The Faster Growth and Slower Growth sensitivity tests (defined in Chapter 3 of the ES (CD1.10)) have been quantitatively assessed with regard to noise: air noise, ground noise and road traffic noise. These cases assess the point at which 9mppa is reached, Faster Growth in 2029 and Slower Growth in 2033. This affects the level of modernisation of the forecast movements as set out in the evidence of Louise Congdon (APP/1).
- 8.1.2 In terms of air noise, ground noise and road traffic noise (day, night or weekend) the largest noise level difference between either the faster or the slower case and the core case is 0.1 dB (a negligible difference). The full assessment is reported in Chapter 8 and Appendix 8.3 of the ES (CD1.39).
- 8.1.3 The sensitivity tests therefore confirm that in the event that growth in passengers at the Airport is slightly faster or slower than the core DC Scenario suggests, no material change is expected in the noise effects reported for the core scenario, it just changes when the effects would occur.

8.2 Proposed Early Morning Limit Scenario (0630 to 0659)

- 8.2.1 This sensitivity test assessed quantitatively the noise effects in the event that the Airport was to operate the maximum of 9 movements every early morning throughout the 92-day summer period (excluding Sundays).
- 8.2.2 In terms of night-time air noise, ground noise and road traffic noise the largest noise level difference between the 2031 Proposed Early Morning Limit and the core scenario is 0.2 dB for ground noise and 0.1 dB for air noise (both are negligible differences). The full assessment is reported in Chapter 8 and Appendix 8.3 of the ES (CD1.39).
- 8.2.3 The sensitivity test therefore confirms that if the average number of early morning flights over the summer period were greater than forecast, no material change is expected in the night-time noise effects assessed for the core scenario.

8.3 Alternative Fleet Mix Scenario

- 8.3.1 This scenario tests whether the operation of the A220-300 (or any other new generation aircraft with a similar noise performance to the A220-300) at the weekend would change the noise assessment results for the core scenario.
- 8.3.2 In terms of weekend air noise, ground noise and road traffic noise the largest noise level difference between the 2031 Alternative Fleet Mix and the core scenario is 0.2 dB (a negligible difference). The full assessment is reported in Chapter 8 and Appendix 8.3 of the ES (CD1.39).
- 8.3.3 The sensitivity test therefore confirms that the potential operation of the A220-300 or similar aircraft at the weekend would result in no material change to the noise effects assessed for the core scenario.

9. Summary of residual noise impact (harm) reported in the ES

9.1.1 As summarised in Table 9.1, the noise assessment in Chapter 8 of the ES (CD1.15) has shown that there are no new or materially different significant operational noise effects due to the Proposed Amendments, from those identified previously in the 2015 ES.

Table 9.1: Summary of Residual Environmental Effects

Noise Source	Period	Overall Effect Rating	Significant/Not Significant
Air Noise	Daytime	Negligible	Not Significant
	Night-time	Negligible to Minor Adverse	Not Significant
	Weekend	Negligible	Not Significant
Ground Noise	Daytime	Negligible	Not Significant
	Night-time	Negligible to Minor Adverse	Not Significant
	Weekend	Negligible to Minor Adverse	Not Significant
Road Traffic Noise	Daytime ¹⁰	Negligible	Not Significant
	Weekend	Negligible	Not Significant
Construction Noise	Daytime	Negligible	Not Significant
	Night-time	Negligible to Minor Adverse	Not Significant

9.1.2 As no significant effects have been identified, no further mitigation is required to reduce the noise beyond that introduced as part of the CADP1 permission and outlined in the list above. Nevertheless, the Appellant is proposing to enhance the SIS as part of the Proposed Development. The enhanced SIS will provide the full cost of insulation (including mechanical ventilation) for properties exposed above the aircraft air noise Significant Observed Adverse Effect Level (SOAEL) for day and night.

9.1.3 As a result of the Proposed Amendments, the summer average daytime 57 dB $L_{Aeq,16hr}$ noise contour area is forecast to reduce to 7.2 km², 17% smaller than 2019 and 20% smaller than the current contour limit as a result of the incentivising the transition to quieter new generation aircraft. The reduction of the summer average daytime 57 dB $L_{Aeq,16hr}$ noise contour area to 7.2 km² when the Airport reaches 9 mppa is proposed to be secured via a planning condition.

9.1.4 The enhanced SIS is brought forward as part of the Appellant's continuing programme of reviewing and enhancing noise management at the Airport in line with its Noise Action Plan (CD5.4) and to ensure the effectiveness of the SIS in accordance with national policy and guidance. It is also to be ahead of the expected change in the Government's expectation for noise insulation schemes as flagged in its Aviation 2050 consultation document (CD3.5.4).

¹⁰ The daytime road traffic noise assessment covers the airport's entire operational period as so includes night-time noise associated with the airport.

10. National policy compliance

10.1.1 The aims set out in the Noise Policy Statement for England (CD3.7.2) are:

“Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- avoid significant adverse impacts on health and quality of life;*
- mitigate and minimise adverse impacts on health and quality of life.*
- where possible contribute to the improvement of health and quality of life.”*

10.1.2 Following PPG-N (CD3.7.7) and precedent (see Section 3 of my evidence), the first aim of the NPSE, to avoid significant adverse effects, is met by the Intermediate Tier and the Second Tier of the enhanced SIS that would be secured as a planning obligation, together with the measures included in the Noise Management and Mitigation Scheme (NOMMS) that are secured by proposed conditions. The Intermediate and Second SIS Tiers offer insulation where levels of exposure are above SOAEL.

10.1.3 The second aim of the NPSE, to mitigate and minimise the adverse impacts, is met by the NOMMS and the commitment to permit only quieter new generation aircraft to operate in the proposed extended Saturday period and for the additional flights above the currently permitted number in the early morning period (0630 to 0659). This mitigation is secured by proposed conditions.

10.1.4 Meeting the third aim of the NPSE, to improve where possible, is evidenced by the forecast reduction in average summer daytime noise levels and contour areas in 2025, 2027 and 2031 compared to 2019, taking account of the Proposed Amendments and the embedded and secured mitigation. This is due to the introduction of quieter aircraft over time, incentivised by the Proposed Amendments. With the Proposed Amendments, the 57 dB average summer daytime contour would be around 17% smaller by the time the Airport grows to 9 mppa than 2019, and 20 % smaller than the current contour area limit. The number of people significantly affected by daytime air noise is also expected to reduce by the time the Airport grows to 9 mppa compared to 2019.

10.1.5 This improvement also shows how the Proposed Amendments share the benefits of the noise reduction from the new generation aircraft with local communities in line with aviation noise policy as set out in the APF.

10.1.6 As I have set out in my evidence, taking account of the embedded mitigation, as well as the daytime noise decreases there are some increases in aircraft air noise levels at night-time and weekends in 2025, 2027 and 2031. The effects of these increases are considered negligible to minor adverse but not significant. There are therefore no new or materially different operational noise effects due to the Proposed Amendments.

10.1.7 The evidence of Ms Congdon (APP/1) demonstrates the substantive regenerative and economic benefits provided by the Proposed Amendments.

10.1.8 Taken together the above evidence and conclusions (paras 4.10.2 to 4.10.7) show how the Proposed Amendments are in line with the Government's OANPS (CD3.7.3),

“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."

- 10.1.9 This conclusion is reinforced by the Policy Paper accompanying the Overarching aviation noise policy statement notes (at paragraph 8):

"We [the government] consider that "limit, and where possible reduce" remains appropriate wording. An overall reduction in total adverse effects is desirable, but in the context of sustainable growth an increase in total adverse effects may be offset by an increase in economic and consumer benefits. In circumstances where there is an increase in total adverse effects, "limit" would mean to mitigate and minimise adverse effects, in line with the Noise Policy Statement for England."

11. Responding to the reasons for refusal

- 11.1.1 RfR1 relates to noise and states:

"1. The proposal, by reason of the additional morning and Saturday flights, and reduction of the existing Saturday curfew would result in a new material noise impact which would result in significant harm to the residential amenity of nearby residential properties. This would be contrary to policies D13 and T8 of The London Plan (2021) and policies SP2 and SP8 of the Newham Local Plan (2018)." (CD4.4.1)

- 11.1.2 I respond to RfR1 in the following sub-sections of my evidence, providing specific response to issues raised in LBN's SoC (CD10.2) and areas of disagreement with LBN as set out in the SoCG as relevant (CD11.2).

- 11.1.3 Sean Bashforth's evidence (APP/3) deals with planning policy and the overall planning balance and responds also to the second reason for refusal.

11.2 Additional early morning flights

- 11.2.1 In this section of my evidence, I respond to that part of LBN's first reason of refusal that relates to additional early morning flights.

Noise indicators and precedent (associated with additional early morning flights)

- 11.2.2 Paragraph 5.6 of the LBN SoC states *"There are very limited data in the literature to enable noise indices, and changes in their values, to be used to assess the significance of the effect of increase the number of aircraft movements in the half hour between 0630 and 0700". (CD10.2)*

- 11.2.3 The additional morning flights would occur in the night period (2300-0659) defined in the ENR (CD3.7.1) and CAA guidance in SoNA (CD3.7.4). This is a time when most of the population will be indoors and potentially asleep.

- 11.2.4 As I have noted at section 3 of my evidence, in 2021 the CAA reconfirmed that summer average $L_{Aeq,8hr}$ (2300-0700) metric is the best indicator of self-reported sleep disturbance (CD3.7.5). This conclusion is based on further analysis of the SoNA 2014 survey of attitudes to aircraft noise around Heathrow, Gatwick and Stansted airports. All three airports are subject to night flight restrictions that include a night quota period that substantially constrains the number and noisiness of aircraft movements between 23:30 to 06:00 (including a voluntary ban on scheduled passenger aircraft movements at Heathrow 23:30 to 06:00 for departures and short-haul arrivals and 23:30 to 04:30 for long haul arrivals). This means that community response to aircraft noise relied on in the CAA's advice is strongly influenced by noise exposure during what are often called the 'shoulder hours', particularly 06:00 to 07:00 which is directly relevant to the Airport's operations between 06:30 to 07:00 and hence the noise assessment of the Proposed Amendments.
- 11.2.5 At paragraph 5.5 of its SoC, LBN asserts "*The unusual feature of this application is that there are potential effects that are very specific to local circumstances, namely the increase on early morning aircraft movements ...*".
- 11.2.6 I note that early morning aircraft movements and change in such movements is not unusual. Changes in such operations have been approved at Bristol and Stansted Airport expansions. Further, similar changes have been recently approved as part of London Luton Airport's s73 application to grow to 19 mppa (CD8.6). The noise assessments in all cases have relied on the summer average $L_{Aeq,8hr}$ noise as the primary indicator in line with CAA guidance.

Mitigation and residual significant effects (associated with additional early morning flights)

- 11.2.7 Taking account of the embedded mitigation, which would mean that only the quietest new generation aircraft will operate the additional movements, the ES noise assessment acknowledges that the Development Case would result in noise increases (generally change less than 2 dB in the summer average $L_{Aeq,8hr}$) compared with the Do Minimum case. However, these are changes in noise outdoors whereas the effects would be predominantly experienced indoors. Indoor effects would be avoided or mitigated by the enhanced SIS which would reduce noise inside to provide good living conditions¹¹ in bedrooms and living spaces, therefore avoiding any significant adverse effect on people's health and quality of life¹².
- 11.2.8 As shown in Appendix 1 (APP/2/B/1) to my evidence, this conclusion is robust. This is the case whether the threshold for potential significance is taken as a 2 dB increase above SOAEL (as adopted in the ES), or an even more precautionary 1 dB approach is taken (as was considered as part of the approved application for London Luton Airport to expand from 18 mppa to 19 mppa (CD8.6)).
- 11.2.9 There is therefore no new material noise impact arising from the Proposed Amendments and hence there is no resulting significant harm to the residential amenity of nearby residential properties. As a consequence, there is no requirement to constrain the number of aircraft movements between 06:30 and 06:59 to mitigate significant adverse effects as suggested at paragraph 5.10 of LBN's SoC.

¹¹ In line with NPPF paragraph 185 and BS8233; 2014 and ProPG

¹² Consistent with precedent, for example the decision to overturn the refusal of Heathrow Airport Ltd's application to end the Cranford Agreement (CD8.5) at paragraph 16 and the inspector's conclusion at P.1087 of his report that "I consider that the proffered mitigation [full noise insulation] between SOAEL and UAEL is consistent with the APF and would be sufficient to avoid significant observed adverse effects".

Health effects (from the noise change associated with additional early morning flights)

- 11.2.10 Health effects associated with the Proposed Amendments are considered by Ryngan Pyper in a statement appended to the evidence of Sean Bashforth (APP/3/B/3).
- 11.2.11 As noted in the Appellant's SoC (CD10.1), on behalf of LB Newham, Mr Thornley-Taylor undertook a review (CD4.5.8) of ES Chapter 8 (Noise) (CD1.15) and Chapter 12 (Health) (CD1.19). The Appellant responded in detail to the issues raised and I consider that matters have been fully addressed.
- 11.2.12 In his review, Mr Thornley-Taylor does not challenge any of the ES conclusions as set out above. Mr Thornley-Taylor does suggest, however, that there may be a gap in the noise assessment in that the additional population likely to be highly sleep disturbed as a result of the minor noise increases is not based on the research presented in the World Health Organization's Environmental Noise Guidelines for the European Region 2018 (ENG) (CD3.6.9).
- 11.2.13 First, it is important to note that in the ES both Chapters 8 (noise) and 12 (health) assess the nighttime noise including its potential effect on sleep. Sleep disturbance was assessed in the ES (8.6.67) (CD1.15). The assessment found that by 2031 sleep disturbance would be lower with the Proposed Amendments than without (because of increased number of quieter aircraft in the fleet mix). Further, this does not allow for the internal reductions that would be expected from the existing and enhanced SIS.
- 11.2.14 Secondly, in his review Mr Thornley-Taylor notes that the *"research which led to these [ENG] figures did not take into account whether or not the residents studied had sound insulation installed in their homes. If that were taken into account, the %HSD could be less than reported in the WHO ENG."* The Appellant has, however, committed to an improved SIS (secured by planning obligation) to reduce noise inside bedrooms and living spaces to maintain good living conditions in bedrooms and living spaces, thereby avoiding any significant adverse effect on people's health and quality of life that could otherwise arise due to the minor increases in outdoor noise. In committing to the improved SIS and taking it into account in the noise assessment, there is a reduction in sleep disturbance as I have already noted.

Conclusion

- 11.2.15 Taking account of the embedded mitigation including the enhanced SIS, the additional morning flights do not result in a new, material noise impact and therefore do not result in significant harm to the residential amenity of nearby residential properties.

11.3 Reduction of the existing Saturday afternoon curfew

- 11.3.1 In the following sub-sections of my evidence, I will address the matters raised in LBN's SoC (CD10.2) and also the matters raised by Mr Thornley-Taylor in his written review of the ES (CD4.5.8) that informed LBN's decision to refuse the S73 Application for the Proposed Amendments with regard to the proposal to permit flights on a Saturday afternoon (till 1830 and 1930 during British Summer Time).

Precedent

- 11.3.2 At paragraph 5.5 of its SoC, LBN asserts *"The unusual feature of this application is that there are potential effects that are very specific to local circumstances, namely the ... loss of respite [sic: curfew] on Saturday"*. Emphasis added.

- 11.3.3 As already noted in my evidence, with the exception of Heathrow expansion with a new NW runway, because of their socio-economic impact on airport operations, Government policy places no requirement or even expectation for airports to employ curfews to control air noise.
- 11.3.4 Curfews are therefore unusual and hence assessing the noise affects associated with reducing or removing a curfew are also unusual. Such changes and assessments are not, however, without precedent.
- 11.3.5 The Cranford Agreement at Heathrow was, in effect, a curfew on easterly scheduled departures from the northern runway at Heathrow¹³. The agreement was very specific to the local circumstances and was in place to ensure that communities immediately to the east of the northern runway were not overflowed by take offs.
- 11.3.6 In February 2017, the Government allowed Heathrow Airport Limited's (HAL) appeal against London Borough of Hillingdon's refusal to permit the enabling works required to end the Cranford Agreement (CD8.5). For reasons not relevant to this Appeal, this permission has not been implemented.
- 11.3.7 Of relevance to this Appeal, however, I would note that:
- a. The 10% reduction in curfew hours sought by the Appellant at the Airport is much smaller than that associated with ending the Cranford Agreement at Heathrow. The duration of the remaining curfews at the Airport will still be longer than any other airport in the UK, and around twice as long as the voluntary scheduled night flight curfew remaining at Heathrow.
 - b. The relief from noise for around 1/3 of the year provided to communities to the east of the Heathrow northern runway was not considered or described as 'respite'. The term 'respite' was applied to the predictable periods of relative noise relief provided by runway alternation (that is not possible at the Airport) in line with government policy as I have set out in section 3 of my evidence. This is relevant as Mr Thornley-Taylor in his review paper of the ES for the Development Case at the Airport sought to draw parallels between the ongoing respite research at Heathrow and the reduction of the Saturday curfew at the Airport. However, no such comparison was made with regard to the assessment or decision making relating to the works required to implement the ending the Cranford Agreement (CD8.5). As I have emphasised in my evidence (Section 3), policy distinguishes between a curfew and respite, by way of runway or flightpath alternation, and the socio-economic and consumer impact of a curfew is materially greater.
 - c. The values of SOAEL and UAEL used for assessing air noise for the ending of the Cranford Agreement at Heathrow are the same as those adopted for the assessment of the Development Case at the Airport.
 - d. Regarding sound insulation, the Inspector's Report for the Cranford appeal (CD8.5) recommended (paragraphs 1086 and 1087), and the Secretaries of State accepted, that the offer to meet the full cost of any sound insulation measures where noise levels exceed the relevant SOAEL value and a 3 dB or greater noise change is forecast was "*sufficient*

¹³ Aircraft were banned from taking off in an easterly direction on the northern of the two Heathrow runways over the community of Cranford. Aircraft were not banned from landing over Cranford. This arose from a Ministerial commitment given in 1952 that was observed by the airport operator. The Government subsequently announced in 2009 that the agreement should end. The Cranford planning permission was for some adjustments to the runway entries to allow easterly take offs on the northern runway. In the event, this has not yet been put into effect through Heathrow has a single runway, night alternation pattern that includes northern runway departures over Cranford.

to avoid significant observed adverse effects". The Appellant's enhanced SIS at the Airport benefits many more people as the full costs of sound insulation are met for properties where noise exceeds the SOAEL value regardless of noise change. This is relevant to LBN's SoC where it notes the potential change in criteria for identifying significant EIA effects above SOAEL as a result of the now granted s73 application to expand London Luton Airport operations to 19 mppa (CD8.6). I return to this matter later in my proof and consider it in more detail in Appendix 1 (APP/2/B/1).

- e. In allowing the appeal for ending the Cranford Agreement some weight was given to noise mitigation such as *"restrictions on aircraft noise emissions, Noise Preferential Routes, Continuous Decent Approaches, Airport Noise Monitoring, Noise Limits and Fines and the Noise Action Plan"* even though they were not 'scheme specific', as is the case for the Development Case at the Airport, because *"...in their absence, local residents would experience higher levels of noise and thus they can, in PPG terms, be regarded as mitigating the noise impact..."* (Inspector's Report, para 1075)
- f. The Inspector's report also noted that *"For outdoor community areas, and starting at areas within the 54dB LAeq, 16 hour contour ..., the Authorities believe that HAL should be required to reconsider their position and offer mitigation to address the effect on such areas, as a necessary part of mitigating the impacts of the scheme. The suggested mitigations ...include such matters as 'Winter Gardens' and community access via public transport to alternative, quieter facilities... However, as HAL points out there was little before the Inquiry to support the Authorities' suggestions and nothing to show how any such obligations would work or satisfy the requirements of the NPPF. I have not pursued them further."* (Inspector's Report, para 1113).

- 11.3.8 I conclude from the decision to grant the 'Cranford appeal', first, that there is precedent for the proposed reduction in the Saturday afternoon curfew at the Airport and, second, that the Proposed Amendments that are before this Appeal align with the matters that materially informed the Inspector's recommendation and the Secretary of State's decision to grant the 'Cranford appeal'.

Weekend noise indicator

- 11.3.9 In its SoC, at paragraph 5.7 LBN notes *"To assess the issue of noise on Saturday afternoons, air noise predictions have been undertaken in terms of the standard daytime LAeq,16hr metric, but the predictions are based on only the aircraft movements at the weekend. Evidence shall show that this is not a standard assessment metric and there is no support for it in the technical literature."* (CD10.2).
- 11.3.10 First it is important to record, as I have explained earlier in my evidence, the standard approach to noise assessment set out by the CAA is to use the $L_{Aeq,16hr}$ noise level (0700 to 2300) and the $L_{Aeq,8hr}$ noise level (2300 to 0700) for the average summer day and night respectively, as the primary indicators of noise impact. This was reconfirmed in 2021 by the CAA's updated analysis of the SoNA (CD3.7.4), which was based on surveys of people's experience of aircraft noise in their home (both inside and outside, e.g. in balconies and gardens). Further the community surveys that underpin 2014 SoNA were undertaken around Heathrow, Gatwick and Stansted airports and therefore include the presence at Heathrow of the voluntary scheduled night-flight ban and the respite provided on westerly operations by way of runway alternation.
- 11.3.11 The CAA's updated guidance in SoNA (CD3.7.4) concludes that the $L_{Aeq,16hr}$ calculated for the average summer day is still the most appropriate indicator to use to estimate the annoyance arising from aircraft noise. The CAA guidance is to assess daytime noise by reference to the average summer day whether that be a weekday or Saturday. The Government and CAA

guidance advises that further information should be provided to support engagement with communities by way of supplementary indicators such as the above indicators.

- 11.3.12 Such assessments and supplementary information have been provided as part of the ES (CD1.15) as I have set out in Section 7 of my evidence.
- 11.3.13 Recognising the community and LBN concern regarding the proposal to reduce the Saturday curfew, the Appellant's noise assessment went above and beyond Government and CAA guidance and also calculated the $L_{Aeq,16hr}$ metric for aircraft movements at the weekend (therefore increasing the focus on the proposed changes in the curfew). Even with this increased focus, the assessment concluded that the effects of the Proposed Amendments were negligible to minor adverse but not significant.
- 11.3.14 At paragraph 5.9 of its SoC, LBN asserts that the reduction in Saturday afternoon curfew would be "*negative and result in material harm to residential amenity*".
- 11.3.15 LBN's SoC (CD10.2) provides no evidence for this assertion and identifies no alternative approaches to assessing the noise effects arising from the proposed reduction in the Saturday curfew. However, Mr Thornley-Taylor's review (CD4.5.8) that informed the first reason for refusal states: "*The loss of the period of Respite on Saturday afternoons has been evaluated by considering overall weekend noise exposure in $L_{Aeq,T}$ terms, but reference has not been made to work which has been carried out at other airports, including Heathrow, into the value of periods of respite.*" Mr Thornley-Taylor then specifically references the paper "Respite from aircraft noise: high-level overview of journey on building our knowledge" by Nicole Porter, Andy Knowles, Robin Monaghan and Richard Norman (InterNoise 2022, Glasgow) that considers respite provision in the context of runway or flightpath alternation at Heathrow (CD3.7.18).
- 11.3.16 However, it should be noted that the respite research at Heathrow seeks to identify the circumstances that create valued 'respite' between operational modes of the airport (e.g. runway alternation or flight-path alternation). This is to enable Heathrow to plan its future operation to provide increased periods of predictable respite for more people by changing its operational modes. This is in line with the Government's policy definition of 'respite' as noted in Section 2 of my evidence. The research is therefore of not much assistance to the situation in which an airport stops operating to reduce noise (e.g. a curfew or ban as defined by Government policy as set out in Section 2).

Increase above SOAEL to indicate a likely significant effect

- 11.3.17 As noted in Table 9.1 of the SoCG with LBN (CD11.2), where the absolute noise level is above the SOAEL then a change of less than 2 dB has been considered not significant. This is more stringent than for the original CADP1 scheme where a change of 3 dB was the threshold for significant effects. It remains less stringent, however, than the 1dB change used for the application to expand London Luton Airport to 19 mppa but is consistent with the latest Bristol Airport application which was determined on appeal (CD8.1).
- 11.3.18 Since finalising the SoCG with LBN, the London Luton Airport application to expand to 19 mppa has been granted (CD8.6). The decision notes that the agreed thresholds for assessment of noise effects were, for the average summer day:
- LOAEL set at 51dB $L_{Aeq,16hr}$ for day-time noise and 45dB $L_{Aeq,8hr}$ for night-time noise, consistent with the Development Case;
 - SOAEL set at 63dB $L_{Aeq,16hr}$ for day-time noise and 55dB $L_{Aeq,8hr}$ for night-time noise consistent with the Development Case;

- For residential receptors increases in aviation noise of at least 3dB above LOAEL, consistent with the Development Case, and at least 1dB above the SOAEL.

- 11.3.19 Based on the government advice for primary noise indicators, I can confirm that no receptors are identified above SOAEL with a change plus 1 dB or more for summer average daytime noise levels resulting from the Proposed Amendments. I provide further information on this at Appendix 1 (APP/2/B/1).
- 11.3.20 Applying this threshold to the voluntary and supplementary assessment of summer average weekend day noise levels, with reference to Section 7 and Appendix 1, around 2,650 people are forecast to experience increases between 1 and 2 dB above the weekend SOAEL. I consider that this remains a not significant residual effect for the following reasons:
- The weekend daytime noise is supplementary indicator;
 - Section 11.4 of my evidence sets out in more detail the effects arising on a Saturday afternoon and how these are minor adverse and not significant;
 - Earlier in this Section 11 of my evidence I have shown that forecast Development Case noise levels on a Saturday afternoon are lower than Saturday morning which in turn are lower than a weekday (Monday to Friday);
 - The Appellant's enhanced SIS will cover the full cost of secondary glazing and mechanical vents or a contribution towards high acoustic performance double glazing based on the cost of fitting secondary glazing to any property where the forecast weekend noise level exceeds 60 dB (3 dB below the supplementary SOAEL threshold for weekends); and
 - Previous planning decisions¹⁴ have accepted that the offer of sound insulation above SOAEL as sufficient additional mitigation to avoid daytime as well as night-time significant effects on health and quality of life result from noise associated with a development. As I describe in more detail in Section 11.4 of my evidence, this is because greater weight is given in noise assessment guidance to achieve good living standards inside properties, where people tend to spend most of their time, than noise levels in outdoor amenity areas, provided such external noise levels are reduced as far as practicable.

Local Social Survey

- 11.3.21 At paragraph 5.8 of its SoC (CD10.2), LBN asserts that "*the consultation responses received indicate that the loss of the Saturday afternoon curfew would be a significant effect, contrary to the conclusions of the ES.*"
- 11.3.22 Further, as noted in the Appellant's SoC (CD10.1), in his review paper that informed RfR1 (CD4.5.8), Mr Thornley-Taylor advises that a local social survey could confirm whether the reduction in Saturday afternoon curfew could be a significant effect, contrary to the conclusions of the ES. However, he does not elaborate on the scope of such a survey nor how its conclusions could establish the 'significance' of the effect. Moreover, LBN did not seek a social survey by way of an EIA Regulation 25 request, nor did it discuss with the Applicant the merits in undertaking such a survey.
- 11.3.23 From my experience and guidance on social surveys¹⁵, Mr Thornley-Taylor's suggestion of a local social survey into attitudes associated with Saturday afternoon respite would not be technically reliable. When social surveys on noise are conducted at the same time as a

¹⁴ For example, ending the Cranford agreement at Heathrow (CD8.5), Thames Tideway DCO, highway DCOs since 2014 and HS2 Phase 1 and Phase 2A hybrid Bills.

¹⁵ CAP1506: Survey of Noise Attitudes 2014: Aircraft Noise and Annoyance, Second Edition, 2021 (CD3.7.4)

development is proposed, it usually brings the development proposals to the forefront of respondents' minds, and this can change reported annoyance.

- 11.3.24 The CAA surveys (CD3.7.4) are therefore conducted in as neutral a manner as possible (e.g., respondent groups are selected to avoid any impact from development proposals, the public are not informed it is a survey about noise, the questions are not leading in order to ensure the results are representative and fair and the survey is also undertaken with control groups).
- 11.3.25 This is important because it is these surveys and their analysis (CD3.7.4) that underpins the noise indicators and LOAEL values defined in government policy (CD3.7.8).

11.4 Noise effects arising from the reduction in the Saturday curfew

- 11.4.1 Paragraph 5.3 of LBN's Statement of Case (CD10.2) asserts "*the proposal would result in a materially new and substantially negative impact on residential amenity in terms of noise resulting from the reduction of the existing curfew.*"
- 11.4.2 Given that the Airport operates every day including Saturday morning and Sunday afternoon and evening, any negative impact from aircraft noise on residential amenity would not be "materially new"; it already occurs.
- 11.4.3 As I have already noted in my evidence, by using the additional summer average weekend day indicator that focuses on the reduction in the Saturday curfew, the ES concludes that there are negligible adverse effects but that they are not significant.
- 11.4.4 Building on this, another means of identifying any noise harm arising from a reduction of the Saturday curfew, is to consider how extending the Saturday hours of operation might result in additional effects and / or differential effects compared to those that already occur on Saturday mornings, Sunday afternoons and weekdays.
- 11.4.5 To inform this, Table 11.1 is developed from the information in the ES (core case) and presents average summer air noise levels for Saturday morning, Saturday afternoon, Sunday and weekdays. The noise levels for these periods are presented for both the 2019 baseline and with Development Case (DC) scenario.

Table 11.1: Comparison of noise levels for different periods of the week and weekend
(PA = Development Case)

Location	L _{Aeq,T} Noise Levels [dB]											
	Saturday Avg						Sunday Avg				Mon-Fri Avg	
	Morning T = 07:00-12:30		Afternoon T = 12:30-19:30		Evening T = 19:30-23:00		Morning T = 07:00-12:30		Afternoon/Evening T = 12:30-23:00		Day T = 07:00-23:00	
	2019	2031 PA	2019	2031 PA	2019	2031 PA	2019	2031 PA	2019	2031 PA	2019	2031 PA
(1) Blackwall / A1261	58	57	-	55	-	-	-	-	59	57	60	58
(2) Britannia Village	63	62	-	60	-	-	-	-	64	62	65	63
(3) Silvertown / A1020	60	60	-	58	-	-	-	-	61	60	62	61
(4) Custom House	58	59	-	56	-	-	-	-	59	59	60	59
(5) Camel Road	65	65	-	63	-	-	-	-	66	65	66	66
(6) Royal Albert Dock (north)	63	63	-	60	-	-	-	-	63	63	64	64
(7) North Woolwich (north)	59	59	-	56	-	-	-	-	59	59	60	60
(8) Thamesmead	60	59	-	56	-	-	-	-	61	59	61	60
(9) Eastern Quay Apts, Britannia Village	64	63	-	61	-	-	-	-	65	63	66	64
(10) Coral Apts, Western Gateway	62	61	-	58	-	-	-	-	63	61	64	62
(11) Silvertown Quays	67	66	-	64	-	-	-	-	68	66	69	67
(12) Ramada Hotel	65	64	-	62	-	-	-	-	65	64	66	65

- 11.4.6 Table 11.1 shows that noise levels with the Development Case:
- would be lower on a Saturday afternoon than a Saturday morning
 - would be lower on a Saturday afternoon than a Sunday afternoon/evening;
 - would be lower on a Saturday morning and Sunday afternoon/ evening than a weekday (Monday to Friday); and
 - would be lower on a Saturday morning, Sunday afternoon/evening and each weekday than the baseline (2019). This is a wider noise benefit resulting from the re-fleeting to quieter aircraft incentivised by the Proposed Amendments.
- 11.4.7 Based on Table 11.1, the source of any additional or differential noise effects centres on a Saturday afternoon is therefore not new or different noise as the noise levels on a Saturday afternoon would be lower than at any other time during the week or weekend.
- 11.4.8 Any potential difference in effect due to reducing the Saturday afternoon curfew would therefore only arise from difference in receptor activity on a Saturday afternoon compared to other times.
- 11.4.9 Education facilities are not generally used on a Saturday and there is no difference in the use of healthcare facilities.
- 11.4.10 The areas of activity, or amenity, where interested parties generally note increased activity on a Saturday afternoon are:
- Increased retail (there is no evidence of a relationship between noise level and retail activity);
 - Increased time at home;
 - Increased use of outdoor spaces (e.g. balconies, gardens and outdoor public space); and
 - Increased or sole use of venues for family and community gatherings.

Increased time at home

- 11.4.11 Government and professional practice guidance for noise assessment makes no distinction between Saturday afternoons, weekends or weekdays. This also reflects a trend towards more flexible working patterns facilitated by remote working and accelerated by the pandemic.
- 11.4.12 People generally spend more time indoors than outdoors. Some surveys even indicate this could be up to 90% of people's time¹⁶.
- 11.4.13 People whose indoor residential environments could be affected by air noise from the Airport are eligible under the SIS and will benefit from the enhanced SIS ensuring that significant adverse effects on health and quality of life inside residential receptors are avoided and adverse effects are mitigated and minimised.

Increased use of outdoor space

- 11.4.14 As noted, people generally spend more time indoors than outdoors. Where there is increased use of outdoor space on a Saturday afternoon for example outdoor social gathering and recreational sport, it is first important to note that this is only a matter of degree. Such spaces are used for such uses at other times of the week and weekend. So, any noise effects arising from the

¹⁶ Road.cc article February 2018: <https://road.cc/content/news/217728-brits-spend-92-all-their-time-indoors>

Proposed Amendments can only be differential or additional, they are not new as suggested by LBN's SoC (CD10.2).

- 11.4.15 Table 11.1 above shows that noise levels on a Saturday afternoon would be lower than a Saturday morning, and lower still than a typical summer weekday. Underpinning this is the forecast which is for 80 aircraft movements on a typical summer Saturday afternoon. This is around 6 aircraft 'noise events' per hour at any receptor location, so one every 10 mins on average meaning that most of the time outdoor activities will not be impacted. Furthermore, such Saturday overflights that do occur will be by quieter aircraft than those that typically fly now. So, to any extent that outdoor spaces are used more on a summer Saturday afternoon, the form of Appellant's proposals is that Saturday afternoon noise would be lower than on any other day of the week.
- 11.4.16 It also needs to be understood that the outdoor areas within the noise contours are already located in a densely built up urban area close to an international airport with many other noise sources, including road and rail noise. Social activities in these outdoor areas are not currently confined to Saturday afternoons and Sunday mornings and there is no reason to believe that they will not continue with the proposed extension of operating hours on a Saturday afternoon.
- 11.4.17 ProPG (CD3.7.21) notes that noise assessments to support planning decisions should include an "assessment" of external amenity areas rather a quantitative analysis of forecast noise levels against acceptability thresholds that ProPG applies to residential development. As noted in ProPG this builds on the advice in BS8233:2014 (CD3.7.24) which states that the resulting noise levels outside are never a reason for refusal as long as levels are designed to be as low as practicable, as is the case for the Proposed Amendments.
- 11.4.18 The improved Community Fund secured by the s106 agreement provides £3.85m over ten years specifically designed in part to improve outdoor amenity areas within the noise contours to compensate for loss of curfew and the associated minor adverse noise effects, as I have described in this section of my proof and in section 7.

Venues used for family and community gatherings

- 11.4.19 While some community venues within the daytime SOAEL contour (eg Britania Village Hall) are used on summer Saturday afternoon's they are not solely used at these times.
- 11.4.20 As noted for outdoor spaces, such venues would be less affected by the Airport's aircraft movements proposed for a Saturday afternoon than during the week or Saturday morning as there would be fewer aircraft movements (typically six per hour) and they will be quieter aircraft.
- 11.4.21 None of the responses to the CADP1 consultations identified receptors that are only used or predominantly used on a Saturday afternoon.

11.5 Compliance with the Development Plan

The London Plan

- 11.5.1 In its first reason for refusal, LBN asserts that the Proposed Amendments would be contrary to policies D13 and T8 of The London Plan (2021) (CD3.3.1).

- 11.5.2 In this section I set out the requirements of each policy and why I consider that the Proposed Amendments comply with these policies.
- 11.5.3 **Policy D13** (agent of change) requires (emphasis added):
- “C New noise and other nuisance-generating development proposed close to residential and other noise-sensitive uses should put in place measures to mitigate and manage any noise impacts for neighbouring residents and businesses.”***
- 11.5.4 I have set out at Section 6 of my evidence the extensive embedded mitigation that underpins the Proposed Amendments and how this mitigation is secured. In Sections 7 and 8 of my evidence I have set out that taking account of this mitigation the effects due to additional early morning flights and due to the reduction in the Saturday afternoon curfew are minor adverse and not significant. I have also set out that the same embedded mitigation results in a reduction in weekday noise impacts evidenced by a reduction of 20% in the summer average day 57 dB $L_{Aeq,16hr}$ noise contour area compared to the current contour limit by the time the Airport reaches 9 mppa (also a reduction of 17% compared to 2019 actual 57 dB $L_{Aeq,16hr}$ contour). This results from the increased and accelerated transition to quieter new generation aircraft incentivised by the Proposed Amendments and is proposed to be secured by a planning condition.
- 11.5.5 I also note Section 6 of Sean Bashforth’s evidence that shows that the airport is established in the local context and therefore isn’t a new noise source.
- 11.5.6 Policy **T8** (Aviation) requires (emphasis added):
- “B The environmental and health impacts of aviation must be fully acknowledged and aviation-related development proposals should include mitigation measures that fully meet their external and environmental costs, particularly in respect of noise, air quality and climate change. Any airport expansion scheme must be appropriately assessed and if required demonstrate that there is an overriding public interest or no suitable alternative solution with fewer environmental impacts.”***
- “E Development proposals that would lead to changes in airport operations or air traffic movements must take full account of their environmental impacts and the views of affected communities. Any changes to London’s airspace must treat London’s major airports equitably when airspace is allocated.”***
- 11.5.7 In Section 7 of my evidence, I have set out that the Proposed Development has been appropriately assessed.
- 11.5.8 As noted above, I have also set out in Section 6 of my evidence the extensive embedded mitigation that underpins the Proposed Amendments that meet the environmental costs associated with the Proposed Amendments. I have further set out that taking account of this mitigation the effects due to additional early morning flights and due to the reduction in the Saturday afternoon curfew are minor adverse and not significant. The embedded mitigation also results in a reduction in weekday noise impacts, evidenced by a reduction of 20% in the summer average day 57 dB $L_{Aeq,16hr}$ noise contour area by the time the Airport reaches 9 mppa compared to the current contour area limit.
- 11.5.9 In my view it is clear that the embedded mitigation that underpins the proposed changes in Airport operations and air traffic movements takes full account of the environmental noise impacts associated with the Proposed Amendments. It is also clear, as set out in my Section 4,

that the Proposed Amendments take full account of the views of affected communities and, indeed, the proposals to reduce the curfew on Saturdays were modified following consultation so that a curfew on Saturday evening would be maintained.

Local Plan

- 11.5.10 In its first reason for refusal, LBN asserts that the Proposed Amendments would be contrary to policies SP2 and SP8 of the Newham Local Plan (2018) (CD3.4.1).

- 11.5.11 **SP2** ‘Healthy Neighbourhoods’ requires (emphasis added):

“Development proposals which address the following strategic principles and spatial strategy, and technical criteria will be supported:

1. Strategic Principles and Spatial Strategy:

*iii. **The need to improve employment levels and reduce poverty, whilst attending to the environmental impacts of economic development including community/ public safety, noise, vibrations** and odour and the legacy of contaminated land **as per SP8** ...”*

- 11.5.12 I have set out in Sections 6, 7 and 10 of my evidence how the Proposed Amendments, and the embedded mitigation that underpins them, ‘attends to’ (i.e. effectively mitigates) the environmental noise impacts that would otherwise arise. The evidence of Louise Congdon (APP/1) and Sean Bashforth (APP/3) sets out how the Proposed Amendments will improve employment levels and reduce poverty.

- 11.5.13 **SP8** ‘Ensuring Neighbourly Development’, requires (emphasis added):

“Proposals that address the following Strategic Principles, Spatial Strategy and Design, Management and Technical criteria will be supported:

1. Strategic principles and Spatial Strategy

*a. **All development is expected to achieve good neighbourliness and fairness from the outset by avoiding negative and maximising positive social, environmental and design impacts for neighbours on and off the site;**”*

- 11.5.14 At my Sections 7 and 8, I explain how the Proposed Amendments and their embedded mitigation will ‘avoid’ significant adverse impacts and ‘mitigate and minimise’ adverse impacts for the proposed additional early morning and Saturday afternoon movements in accordance with the approach set out in the NPSE (CD3.7.2), and also how they maximise positive impacts on weekdays as far as reasonably practicable.

12. Other interested parties

12.1 HACAN-East (Rule 6 party)

- 12.1.1 In its SoC (CD10.3), HACAN-East notes that their primary case is “is that the Proposed Amendments would lead to a materially new source of noise for residents in overflowed areas, with a substantively negative impact on residential amenity.”
- 12.1.2 While no SoCG has yet been formally agreed with HACAN-East, I understand from the SoC and engagement between the Airport and HACAN-East that there is no disagreement with:
- The assessment of construction noise;
 - The assessment of road traffic noise; and
 - The methodology for calculating air noise and ground noise resulting from the operation of aircraft at the Airport.

Saturday afternoon operations as a new source of noise

- 12.1.3 At 4.1.1 of its SoC, HACAN-East contend that “*LCA is wrong to suggest that the Appeal Proposal would not constitute a new source of noise for overflowed residents, but rather an extension/intensification of an existing source of noise.*”
- 12.1.4 This contention is also made by LBN to which I have responded at Section 11.4 of my evidence.
- 12.1.5 To reiterate, given that the Airport operates every day including Saturday morning and Sunday afternoon and evening, any negative impact from aircraft noise on residential amenity would not be “materially new”; it already occurs.
- 12.1.6 As I have already noted in my evidence, by using the additional summer average weekend day indicator that focuses on the reduction in the Saturday curfew, the ES (CD1.15) concludes that there are minor adverse effects but that they are not significant.

The amenity of Saturday afternoons is not comparable to other days of the week

- 12.1.7 At 4.1.2 of its SoC, HACAN-East (CD10.3) contend that the “*loss of amenity on Saturday afternoons is not comparable to other days of the week. The current respite period has substantial value to overflowed residents in providing them with time for outdoor leisure pursuits, socialising, or relaxation, free from aircraft noise.*”
- 12.1.8 In Section 11.4 of my evidence, I confirm the conclusion of the ES noise assessment (CD1.15), that extending operations into Saturday afternoon would result in a minor adverse but not significant effect, by further considering how continuing operations into Saturday afternoon could lead to additional or differential noise effects on the receptors that already experience noise from the Airport's operations every day of the week.
- 12.1.9 In Section 11.4, I show that the Airport's operational noise on a Saturday afternoon would be quieter than Saturday morning and quieter than any other day of the week and that on average there would be an aircraft noise event only every ten minutes and this in a built-up urban area with many other noise sources.

- 12.1.10 In Section 11.4, I consider the potential noise effects of Saturday afternoon operations on the areas of activity, or amenity, where interested parties generally note increased activity on a Saturday afternoon are:
- Increased retail (there is no evidence of a relationship between noise level and retail activity);
 - Increased time at home;
 - Increased use of outdoor spaces (e.g. balconies, gardens and outdoor public space); and
 - Increased or sole use of venues for family and community gatherings.
- 12.1.11 In Section 11.4, I show that the resulting effects are minor adverse having been mitigated and minimised by the following embedded mitigation:
- The continued noise mitigation measures set out in the Airport’s Noise Action Plan and in the NOMMS;
 - The commitment to only operate quieter aircraft on Saturday afternoon;
 - The continuation of the curfew on operations on a Saturday evening, through to lunchtime on Sundays; and
 - The enhanced SIS that protects good living standards.

Consultation responses indicate that the loss of the Saturday afternoon curfew would constitute a significant effect

- 12.1.12 At 4.1.3 of its SoC, HACAN-East contend that while the ES submitted by the Appellant concluded that the effect of implementing the Proposed Amendments would be “minor adverse (not significant)” in terms of noise impact, LBN highlights in its SoC (10.2) that the consultation responses received indicate that the loss of the Saturday afternoon curfew would constitute a significant effect, contrary to the conclusions of the ES and that HACAN East supports LBN’s conclusion.
- 12.1.13 The local response to consultation on the Proposed Amendments is not an accepted nor a robust method for identifying significant effects of a proposal in terms of environmental impact assessment. It is not recognised for this purpose in the EIA Regulations (CD3.1.4) or best practice guidance such as the Institute of Environmental management and Assessment (IEMA) Guidelines for Environmental Noise Impact Assessment 2014 (CD3.7.22).
- 12.1.14 As I have set out in Section 4 of my evidence, the noise assessment undertaken of the Proposed Amendments is in line with policy and is in line with guidance both from the Government and professional bodies such as IEMA.
- 12.1.15 I note in Section 11.3 of my evidence that Mr Thornley-Taylor advises on behalf of the LPA that a local social survey could confirm whether the reduction in Saturday afternoon curfew could be a significant effect, contrary to the conclusions of the ES. I set out in Section 11.3 why such a survey could not be relied upon and that robust community exposure-response surveys have been carried out by the CAA and form the basis of government policy and guidance which has been followed in the noise assessment of the Proposed Amendments.

Significant effect within the noise contour area, and a material effect for many miles outside it

- 12.1.16 At 4.1.4 of its SoC (CD10.3), HACAN-East asserts that the Proposed Amendments would have a significant effect within the noise contour area, and a material effect for many miles outside it.

- 12.1.17 As I have set out in my evidence, the assessment in the ES (CD1.15) considers noise exposure within the LOAEL contours. Section 3 of my evidence explains that, for aviation noise, LOAEL values are set by government policy (CD3.7.7) and government guidance (CD3.5.9) that states that the LOAEL thresholds for aviation should be “*regarded as the point at which adverse effects begin to be seen on a community*”. This is consistent, for example, with the recent decision to grant London Luton Airport’s application to expand to 19 mppa (CD8.6) where the inspectors and Secretary of State concluded that areas overflowed outside the 51 dB daytime contour and the 45 dB night-time LOAEL contours would not experience harm to amenity.
- 12.1.18 In line with government guidance and planning decision making precedent, the ES and Sections 7, 8 and 9 of my evidence show there are no significant effects for many miles outside the noise contours.

Precautionary approach to health impacts of extended exposure to unmitigated noise

- 12.1.19 In its SoC at 4.1.5 (CD10.3), HACAN-East contend that the noise arising from the Proposed Amendments is “unmitigated”. This is not correct. I have set out at Section 6 of my evidence the extensive embedded mitigation measures that underpin the Proposed Amendments and how these mitigation measures are secured.
- 12.1.20 The matters raised by HACAN-East at 4.1.5 of its SoC regarding the need for a precautionary approach to the assessment of health impacts are responded to by Ryngan Pyper in his Technical Statement which is appended to the evidence of Sean Bashforth (APP/3/B/1).

New-generation quieter aircraft compared to current aircraft

- 12.1.21 At paragraphs 4.2.1 and 4.2.2 of its SoC (CD10.3), HACAN-East notes the need for ‘*real world validation*’ of the assumptions about new quieter aircraft, that reliance on new-generation aircraft to mitigate impacts is misplaced and that their Citizen Study (CD3.7.20) suggests that the overflight noise of the new generation aircraft is not meaningfully quieter than their predecessors beyond the proximity of the runways.
- 12.1.22 Regarding validation, the noise modelling for the ES followed the same approach as modelling for the noise contours which are regularly produced for London City Airport as part of the Annual Performance Report (APR). The methodology used for the ES and the latest APR was submitted to LBN and approved on 19th October 2022.
- 12.1.23 The CAA sets out minimum requirements for aircraft noise modelling in its guidance, CAP2091: CAA Policy on Minimum Standards for Noise Modelling, 2021 (CD3.7.28). The modelling used for the ES meets and, in some cases, exceeds the requirements for noise modelling set out in CAP2091 for an Airport of the size of LCY.
- 12.1.24 The ES noise modelling is based on real-world validated data. As stated in the ES Chapter 8 (CD10.15) (paragraph 8.3.73 and Table 8-7) and Appendix 8.3: Air Noise (CD1.39) (at page 4), two of the key new generation aircraft types in the future forecast already operate at the Airport. These are Airbus A220-100 and the Embraer E190-E2, which are forecast to make up more than half of the future fleet by 2031. The modelling of these key aircraft types is based on measurements at the Airport’s Noise Monitoring Terminals (NMTs) of these aircraft operating at the Airport. These measurements clearly demonstrate, as shown in Table 8-7 of the ES, that the new aircraft are quieter than existing aircraft such as the Embraer E190. The only future aircraft in the core forecasts which does not currently operate is the Embraer E195-E2. This aircraft is very similar to the E190-E2, being slightly larger, and it has been modelled as slightly louder than the E190-E2, with the difference based on measured certification noise data. Table 8-7 in

the ES also notes the Airbus A220-300. This was subject to a sensitivity test in the ES, as I have noted in Section 5.4 of my evidence, because this type is expected to be the noisiest of the new generation aircraft.

- 12.1.25 The Citizen Study (CD3.7.20) referred to in the HACAN-East SoC was first published in August 2022 and was updated in February 2023. The study reports noise level measurements of aircraft operating from the Airport undertaken by members of the public using a mobile phone app and then seeks to use this data to compare the noise levels of current and new generation aircraft. The Appellant has engaged with HACAN-East about the study.
- 12.1.26 I have reviewed the Study at Appendix 2 (APP/2/B/2).
- 12.1.27 Overall, I do not consider the Citizen Study to provide reliable information or particularly relevant information to this appeal.

Concentration of flight paths

- 12.1.28 At 4.2.3 of HACAN-East's SoC (CD10.3), HACAN note that "*since February 2016, LCA's flight paths have been concentrated, and the noise impacts consequently exacerbated for overflowed residents*". HACAN-East then contend that "*Within this context, the best mitigation in terms of noise impact is that which already exists, namely the 24-hour respite period at weekend*".
- 12.1.29 It is acknowledged that ever improving navigation equipment has resulted in more precise and consistent navigation and hence a concentration of flight paths. However, this reduces the overall number of people affected by air noise and the effect on people under the flight paths will be reduced by the quicker transition to new generation aircraft incentivised by the Proposed Amendments.
- 12.1.30 I have set out in Section 6 of my evidence the substantial embedded mitigation measures that underpin the Proposed Amendments and that as a result of this mitigation the noise effects the result from reducing the Saturday afternoon curfew are minor adverse and not significant.

Current planning permission

- 12.1.31 At 4.2.4 of its SOC (CD10.3), HACAN-East notes that the inclusion of the Saturday afternoon curfew in the conditions attached to CADP1 permission demonstrates that the Inspector (and Secretaries of State) in that appeal considered it necessary, in order to mitigate the noise impact of the previous application, and reasonable.
- 12.1.32 In response, I have set out in Section 6 of my evidence that both the justification and improved embedded noise mitigation for the Proposed Amendments differ from the CADP1 development.
- 12.1.33 I have set out in Section 6 of my evidence the substantial embedded mitigation measures that underpin the Proposed Amendments and that as a result of this mitigation the noise effects the result from reducing the Saturday afternoon curfew are minor adverse and not significant.

12.1.34 **Increased development under the Airport main flight paths**

12.1.35 At 4.2.4 of its SOC (10.3), HACAN-East notes there now exist considerably more residential buildings immediately under main flight paths from the Airport than there were in 2016, with further major developments anticipated in the Docklands area. This will result in more residents living within the noise contour area than there were at the time of the previous application. HACAN-East then asserts that the Proposed Amendments aim to reduce mitigation relating to noise impacts relative to CADP1.

12.1.36 In response I need to stress that:

- The ES and my evidence take full account of development since 2016 and also committed development at the time of the S73 Application;
- Local planning authorities' development control processes seek to ensure that new development is designed to provide good living standards cognisant of noise from the Airport in line with the local development plan and the 'agent of change' principle set out in PPG-N¹⁷; and
- I have set out in my evidence that there are no new or materially different noise effects arising from the Proposed Amendments to the extant CADP1 permission.

¹⁷ Paragraphs 8 and 9 of PPG-Noise, 2019 (CD3.7.7)

13. Summary and Conclusions

- 13.1.1 I set out here my overall summary and conclusions on the noise effects of the Proposed Amendments.

13.2 Reasons for refusal

- 13.2.1 LBN's RfR1 relates to noise:

"1. The proposal, by reason of the additional morning and Saturday flights, and reduction of the existing Saturday curfew would result in a new material noise impact which would result in significant harm to the residential amenity of nearby residential properties. This would be contrary to policies D13 and T8 of The London Plan (2021) and policies SP2 and SP8 of the Newham Local Plan (2018)."

- 13.2.2 LBN's RfR2 relates indirectly to noise, in that the proposed S106 agreement secures the enhanced SIS. The evidence of Sean Bashforth responds to RfR2.

13.3 Legislation, Policy and Guidance

- 13.3.1 I cover these matters in Section 3 of my evidence.

National policy

- 13.3.2 Government's Overarching Aviation Noise Policy Statement ("OANPS") (CD3.7.3) confirms and clarifies government's aviation noise policy, building on the APF (CD3.5.1) and subsequent policy updates as noted in my evidence. The OANPS states at its third and fourth paragraphs that:

- 13.3.3 "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.

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

- 13.3.5 The Aviation Policy Framework ("APF") (CD3.5.1) notes that the benefits of noise reduction should be shared between those significantly affected by aircraft noise and industry.

- 13.3.6 The OANPS links to the Noise Policy Statement for England ("NPSE") (CD3.7.2) at the eighth paragraph:

- 13.3.7 "In circumstances where there is an increase in total adverse effects, "limit" would mean to mitigate and minimise adverse effects, in line with the Noise Policy Statement for England."

- 13.3.8 The NPSE sets out the long-term vision and national policy on noise and has become a golden thread through government's wider planning and aviation policy. NPSE states at paragraph 1.7:

- 13.3.9 “Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:
- avoid significant adverse impacts on health and quality of life;
 - mitigate and minimise adverse impacts on health and quality of life.and
 - where possible contribute to the improvement of health and quality of life.”
- 13.3.10 The NPSE notes the established concept of LOAEL (“Lowest Observed Adverse Effect Level”) as applied, for example, by the WHO and extends the concept to introduce SOAEL (Significant Observed Adverse Effect Level).
- 13.3.11 The Government confirmed that the Consultation Response on UK Airspace Policy, 2017 (CD3.7.8) should be considered current government policy. The Consultation Response makes a number of changes to aviation noise policy and in particular:
- Defines LOAEL values as 51 dB LAeq,16hr day and 45 dB LAeq,8hr night (summer average);
 - Removes the 3 dB minimum change requirement for financial assistance towards acoustic insulation to residential properties exposed to 63 dB LAeq,16hr level or above as a consequence of airport development; and
 - Maintains the Government’s expectation for airports to assist with the costs of moving where exposed to 69 dB LAeq,16hr or more but with a new requirement of an offer of full insulation to be paid for by airports where the homeowners do not want to move.
- 13.3.12 NPSE states that it is not possible to have a single objective noise-based measure that defines a SOAEL that is applicable to all sources of noise in all situations. SOAEL values for aviation noise have become well established by precedent as 63 dB LAeq,16hr day and 55 dB LAeq,8hr night for average summer day and these values are common ground with LBN (CD11.2).
- 13.3.13 LOAEL and SOAEL thresholds are measures of absolute noise and their effect of noise on health and quality of life. EIA findings relate to noise change.
- 13.3.14 Planning Practice Guidance for Noise (“PPG-N”), (CD3.7.7) introduces the UAEL (“Unacceptable Adverse Effect Level”), above the SOAEL, and provides a noise hierarchy using LOAEL, SOAEL and UAEL thresholds (reproduced at Table 3.1 of my evidence).
- 13.3.15 Between SOAEL and UAEL, the hierarchy states that noise is “disruptive”, and the action is to “avoid”. Mitigation at source to minimise adverse effects between LOAEL and SOAEL will also minimise significant adverse effects above SOAEL. Noting, as PPG-N does, that above SOAEL people will keep windows closed for most of the time, the precedent for the further action to be taken above SOAEL is for full noise insulation to be offered as compensatory mitigation. Such insulation is specified to protect good living conditions inside homes and hence ‘avoid’ the residual significant adverse effect on health and quality of life that would otherwise arise. PPG-N (paragraph 005) advises that while decisions about exposure above SOAEL must be made taking account of the economic and social benefit of the activity causing or affected by the noise, it is undesirable for such exposure to be caused.
- 13.3.16 At the highest levels of exposure at or above UAEL, the effect is such that PPG-N and its hierarchy require that such exposure is ‘prevented’ regardless of the benefits of the activity causing the noise. The UAEL values for aviation are agreed with LBN and it is also agreed that the Proposed Amendments do not give rise to noise that exceeds the UAEL thresholds.
- 13.3.17 Aviation policy (CDs 3.5.1, 3.5.2 and 3.5.9) distinguishes between ‘curfew’ and ‘respite’, in summary:

- ‘Curfew’: meaning a ban on scheduled aircraft movements during certain hours of the day or night (with a consequent material impact on consumer and socio-economic benefit); and
- ‘Respite’: meaning continued scheduled aircraft movements during the relevant hours, but with the respite being provided by alternation between airport operation modes or different flight paths.

13.3.18 The CAA reconfirmed in 2021 its guidance (CD3.7.4) on the primary indicators to be used to assess aviation noise (summer average LAeq,16hr for daytime and LAeq,8hr for night-time). These indicators do not differentiate between weekdays and weekends or between morning, afternoon and evening. I note that community surveys that underpin the CAA guidance asked whether people were more disturbed at different times of the day, night and weekend and I note that the operation of the airports around which the surveys were taken include curfews and respite.

Development Plan policy

13.3.19 In its RfR1, LBN asserts that the Proposed Amendments would be contrary to policies D13 and T8 of The London Plan (2021) (CD3.3.1) and policies SP2 and SP8 of the Newham Local Plan (2018) (CD3.4.1).

13.3.20 In terms of noise, I would summarise the requirements of these policies as:

- Any airport expansion scheme must be appropriately assessed;
- Airport development proposals should put in place measures to mitigate and manage any noise impacts;
- Airport development proposals must take full account of their environmental impacts and the views of affected communities;
- Airport development should improve employment levels and reduce poverty, whilst attending to the environmental impacts of noise and vibration; and
- Airport development should avoid negative and maximise positive noise impacts on neighbours.

13.4 Consultation

13.4.1 I deal with consultation at Section 4 of my evidence.

13.4.2 In addition to continuous and ongoing engagement with LBN, the Airport Consultative Committee and other statutory consultees, the Appellant held a ten-week, non-statutory, public consultation in developing the Proposed Amendments. The consultation included public exhibitions, pop-up events, a dedicated website and virtual exhibition. Information was provided through exhibition boards and an Initial Environmental Report. Engagement and consultation activity is summarised in the Statement of Community Involvement (CD1.6).

13.4.3 The key themes and issues raised in consultation responses informed the S73 Application which was revised from the proposals which were consulted on. These changes comprised a reduction in the extended hours sought on a Saturday, a reduction in the number of additional movements sought in the early morning period, and no longer seeking to change the cap on the number of movements that have experienced unavoidable operational delays and so can operate in the last 30 minutes of the operational day (e.g. 2200 to 2230 week days).

13.4.4 It is of note that the noise related matters where there is not common ground noted in the SoCG with LBN (CD11.2) were not matters raised by LBN in response to the consultation or the Appellant’s request for an EIA scoping opinion.

- 13.4.5 In line with the Development Plan, the Appellant has taken full account of the views of affected communities with regard to noise that would arise from the Proposed Amendments.

13.5 Assessment methodology

- 13.5.1 I deal with methodology at Section 5 of my evidence.
- 13.5.2 Chapter 8 of the ES (CD1.15) assesses the likely significant effects of the Proposed Development due to noise and vibration. This takes into account the extensive noise controls that are already in place at the Airport and the enhancements brought forward as part of the Proposed Development. Chapter 8 of the ES presents an assessment of the noise impacts associated with the Development Case including:
- Flights into and out of the Airport (air noise);
 - Aircraft operations at the Airport (ground noise);
 - Road traffic movements related to the Airport (road traffic noise); and
 - Construction of the remaining elements from the CADP1 permission that have not as yet been built (construction noise).
- 13.5.3 As agreed with LBN, an assessment of vibration (both operational and from construction traffic) was scoped out of the ES on the basis that there are not likely to be any likely significant effects.
- 13.5.4 The assessment methodology for each of the four sources (listed above) follows government policy, guidance and precedent that I have summarised earlier, and this is common ground with LBN (CD11.2).
- 13.5.5 Given the unusual nature of the Proposed Amendments to change the Saturday afternoon curfew, the assessment in the ES goes above and beyond guidance and uses a supplementary weekend day noise indicator.

13.6 Embedded mitigation and compensation

- 13.6.1 I set out the substantive embedded mitigation and compensation that underpins the Proposed Amendments at Section 6 of my evidence, including the enhancements proposed to the mitigation measures approved as part of the CADP1 permission and how all mitigation and compensation associated with the Proposed Amendments is to be secured.
- 13.6.2 With regard to air and ground noise, the enhanced noise mitigation underpinning the Proposed Development is:
- A commitment to operate only quieter new generation aircraft for the additional early morning flights and Saturday afternoon flights within a defined noise specification for these types of aircraft, secured by condition; and
 - An enhanced Sound Insulation Scheme (compensatory mitigation) that exceeds government expectations and has specific provisions relevant to the Proposed Amendments.

13.7 Assessment of noise effects

- 13.7.1 I deal with assessment at Section 7 of my evidence.
- 13.7.2 Chapter 8 of the ES (CD1.15) reports the noise assessment including an assessment of construction noise and road traffic noise which are not contested by LBN or HACAN-East.

- 13.7.3 The assessment of air noise and ground noise identifies effects using 2025, 2027 and 2031 as assessment years, based on a core case and taking account of the embedded mitigation and compensation. The assessment for each year considers daytime, night-time and weekends and does this by comparing the Development Case with the equivalent Do Minimum scenario.
- 13.7.4 The ES concludes that:
- There would be negligible to minor adverse effects at night-time due to the increased number of early morning flights, but these effects are not significant;
 - There would be negligible adverse effects at a weekend due to the reduction in the Saturday curfew; and
 - There would be negligible beneficial effects during the daytime due to the Proposed Amendments incentivising the transition to new generation quieter aircraft. These result in the daytime 57 dB LAeq,16hr contour area forecast when the Airport grows to 9 mppa being 20% smaller than the current contour area limit, with 14,000 less people exposed above the 57 dBLAeq,16hr contour.

13.8 Sensitivity tests

- 13.8.1 As noted in Section 8 of my evidence, Chapter 8 of the ES (CD1/15) considers three noise assessment sensitivity tests:
- Faster and slower growth cases (reaching 9 mppa by 2029 or 2033 respectively);
 - A proposed early morning limit scenario (assuming the maximum that would be permitted of nine aircraft movements between 0630 and 0659 occurs every day); and
 - An alternative fleet mix scenario (considering that a proportion of the quieter new generation aircraft movements that would be permitted on a Saturday afternoon are the noisiest type of new generation aircraft, the A220-300).
- 13.8.2 As noted in Section 11 of my evidence, I have presented a further sensitivity test at Appendix 1 to my evidence that considers identifying potential significant effects based on a 1 dB change or more above SOAEL, as used in the recently consented application to grow London Luton Airport to 19 mppa (CD8.6), rather than the 2dB or more change adopted in Chapter 8 of the ES (CD1/15).
- 13.8.3 My evidence shows that none of these sensitivity tests change the conclusions of the ES.

13.9 Summary of residual noise impact (harm) reported in the ES

- 13.9.1 Overall, the ES concludes that there are no new or materially different operational noise effects due to the Proposed Amendments. LBN has agreed that there are no new or materially different noise effects due to construction noise, construction vibration (including from construction traffic) and road traffic noise.

13.10 Policy compliance

National policy

- 13.10.1 The assessment identifies that there are no new or materially different operational noise effects due to the Proposed Amendments and that there are improvements to daytime noise compared to the 2015 Updated ES (UES) associated with the CADP1 planning permission. This meets the OANPS objective to “limit and where possible reduce the total adverse impacts on health and quality of life from aviation noise.”

- 13.10.2 Following PPG-N and precedent, the first aim of the NPSE, to avoid significant adverse effects, is met by the improved Intermediate Tier and the Second Tier of the enhanced SIS that is proposed be secured as a planning obligation, together with the other embedded mitigation and compensation measures that I have noted at 13.6 of my evidence. The Intermediate and Second SIS Tiers offer insulation where levels of exposure are above SOAEL.
- 13.10.3 The second aim of the NPSE, to mitigate and minimise the adverse impacts, is met by the embedded mitigation and compensation that would be secured as part of the Proposed Amendments as I have set out at paragraph 13.6.2 of my evidence.
- 13.10.4 Meeting the third aim of the NPSE, to improve where possible, is evidenced by the forecast reduction in average summer daytime noise levels and contour areas in 2025, 2027 and 2031 compared to 2019. This is due to the introduction of quieter aircraft over time, incentivised by the Proposed Amendments. With the Proposed Amendments, the 57 dBLAeq,16hr average summer daytime contour would be around 20% smaller by the time the Airport grows to 9 mppa than the current contour area limit. It is proposed that this is secured by way of a planning condition. The number of people significantly affected by daytime air noise is also expected to reduce by 2031 compared to 2019, and there would be around 14,000 less people exposed above the 57 dBLAeq,16hr contour.
- 13.10.5 This improvement also shows how the Proposed Amendments shares the benefits of the noise reduction from the new generation aircraft with local communities in line with aviation noise policy as set out in the APF (CD3.5.1).
- 13.10.6 In line with the Government's OANPS (CD3.7.3), my evidence shows how the Proposed Development mitigates noise as much as practicable and realistic to do so, limits total adverse impacts on health and quality of life, and reduces daytime noise. The evidence of Louise Congdon (APP/1) demonstrates the consumer and socio-economic benefits of the Proposed Amendments. The evidence of Sean Bashforth (APP/3) shows how the economic and consumer benefits of the Proposed Development outweigh the noise impacts on health and quality of life in the planning balance.

Development Plan policy

- 13.10.7 I summarise compliance with policies D13 and T8 of The London Plan (2021) (CD3.3.1) and policies SP2 and SP8 of the Newham Local Plan (2018) (CD3.4.1) in Table 13.1. This is addressed more fully in Sean Bashforth's evidence (APP/3).

Table 13.1: Compliance with the key noise requirements in the Development Plan (see section 13.3)

Policy requirement	Compliance
Any airport expansion scheme must be appropriately assessed	Chapter 8 of the ES (CD1/15) provides an appropriate noise assessment. See Section 7 of my evidence.
Airport development proposals should put in place measures to mitigate and manage any noise impacts	The Proposed Amendments includes substantive embedded mitigation and compensation that meets or exceeds Government expectations and is enhanced compared to current measures as part of the Proposed Amendments. See Section 6 of my evidence.
Airport development proposals must take full account of their environmental impacts and the views of affected communities	The noise assessment in the ES and the embedded mitigation and compensation take full account of the environment impacts. See Sections 6 and 7 of my evidence. The Proposed Amendments were modified in response to consultation responses and therefore take full account of the views of the affected communities.
Airport development proposals should improve employment levels and reduce poverty, whilst attending to the environmental impacts of noise and vibration	The evidence of Louise Congdon describes how the Proposed Amendments would improve employment levels and reduce poverty. As indicated above, the Appellant has attended to the environmental impacts of noise and vibration through the mitigation and compensation that is included as part of the Proposed Amendments.
Airport development proposals should avoid negative and maximising positive noise impacts on neighbours	Section 7 of my evidence shows how the Proposed Amendments including the embedded mitigation and compensation avoid negative impacts due to additional early morning flights, avoid impacts due to the reduction of the Saturday afternoon curfew and would create positive impacts during the daytime throughout the week.

13.11 Response to the Reasons for Refusal

13.11.1 I have responded to Rfr1 in Section 11 of my evidence. Rfr1 is:

13.11.2 “1. The proposal, by reason of the additional morning and Saturday flights, and reduction of the existing Saturday curfew would result in a new material noise impact which would result in significant harm to the residential amenity of nearby residential properties. This would be contrary to policies D13 and T8 of The London Plan (2021) and policies SP2 and SP8 of the Newham Local Plan (2018).”

Additional early morning flights

13.11.3 Taking account of the embedded mitigation, that only the quietest new generation aircraft will operate the additional early morning movements, the ES noise assessment acknowledges that the Development Case would result in noise increases (generally changes of less than 2 dB in the summer average LAeq,8hr) compared with the Do Minimum case. However, these are changes in noise outdoors whereas the effects would be predominantly experienced indoors. Indoor effects would be avoided or mitigated by the enhanced SIS which would reduce noise inside to provide good living conditions in bedrooms and living spaces, therefore avoiding any significant adverse effects on people’s health and quality of life.

- 13.11.4 I therefore conclude that, taking account of the embedded mitigation including the enhanced SIS and restricting additional movements to new generation aircraft, the additional morning flights do not result in a new, material noise impact and therefore do not result in significant harm to the residential amenity of nearby residential properties.

Reduction of Saturday curfew

- 13.11.5 Paragraph 5.3 of LBN's Statement of Case (CD10.2) asserts "the proposal would result in a materially new and substantially negative impact on residential amenity in terms of noise resulting from the reduction of the existing curfew."
- 13.11.6 As I have set out in my evidence, the Airport operates every day including Saturday morning and Sunday afternoon and evening. Any negative impact from aircraft noise on residential amenity would therefore not be "materially new", it already occurs every day.
- 13.11.7 As I have noted in my evidence, by using the additional summer average weekend day indicator that focuses on the reduction in the Saturday curfew, the ES concludes that, taking account of the embedded mitigation and compensation, there are negligible adverse effects which are not significant.
- 13.11.8 I have explained in my evidence that noise levels with the Proposed Amendments:
- would be lower on a Saturday afternoon than a Saturday morning;
 - would be lower on a Saturday afternoon than a Sunday afternoon/evening;
 - would be lower on a Saturday morning and Sunday afternoon / evening than a weekday (Monday to Friday); and
 - would be lower on a Saturday morning, Sunday afternoon/evening and each weekday than the baseline (2019). This is a wider noise benefit resulting from the re-fleeting to quieter aircraft incentivised by the Proposed Amendments.
- 13.11.9 I have specifically considered in my evidence the potential noise effects on receptors that might be used additionally or differentially on a summer Saturday afternoon (e.g. homes, outdoor spaces and community facilities) and explained why they would not be significantly affected by noise resulting from the Proposed Amendments.
- 13.11.10 I therefore conclude that, taking account of the embedded mitigation including the enhanced SIS and restricting movements in the extended hours to new generation aircraft, the reduction of the Saturday curfew does not result in a new, material noise impact and does not result in significant harm to the residential amenity of nearby residential properties.

Compliance with Development Plan policies

- 13.11.11 I summarise compliance with the key noise-related requirements of relevant Development Plan policies at Table 13.1 above.

13.12 Response to Rule 6 party (HACAN-East)

- 13.12.1 In its SoC (CD10.3), HACAN-East notes that their primary case “is that the Appeal Proposal would lead to a materially new source of noise for residents in overflowed areas, with a substantively negative impact on residential amenity.”
- 13.12.2 I have explained in Section 13.10 why the Proposed Amendments is not a materially new source of noise and would not give rise to a substantively negative impact on residential amenity.
- 13.12.3 In Section 12 of my evidence and Appendix APP/2/B/1, I respond to each of the matters noted in HACAN-East's SoC.

13.13 Overall conclusion

- 13.13.1 I conclude that the Proposed Amendments including the additional early morning flights, the reduced Saturday curfew and embedded mitigation and compensation (that is proposed to be secured by planning condition or obligation), does not result in a new or material noise impact. The Proposed Amendments therefore does not result in significant harm to the residential amenity of nearby residential properties.
- 13.13.2 My evidence also shows how the Proposed Amendments is in accordance with national aviation and noise policy and accords with the Development Plan.