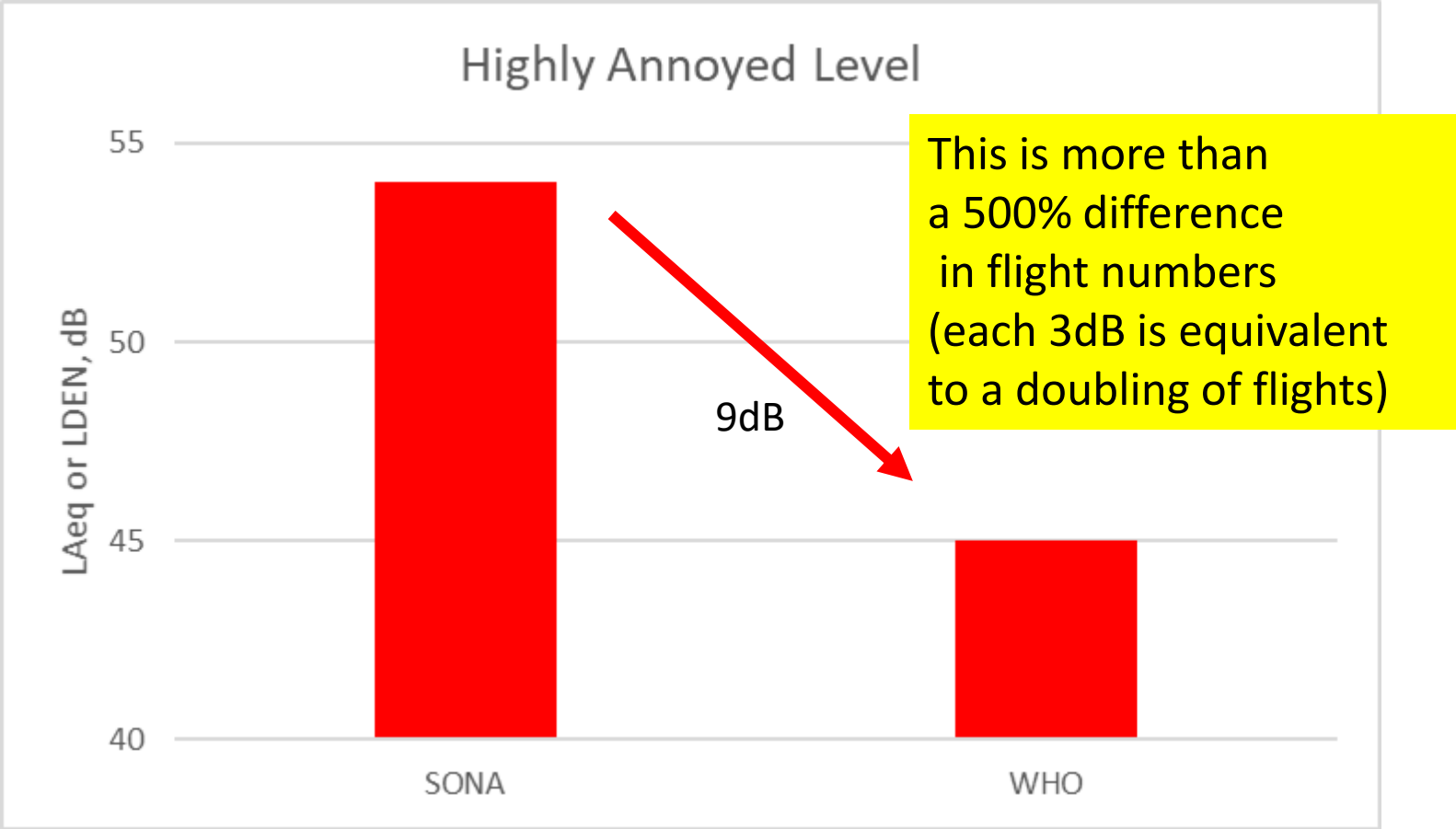


Proposed Independent Consultant Study;

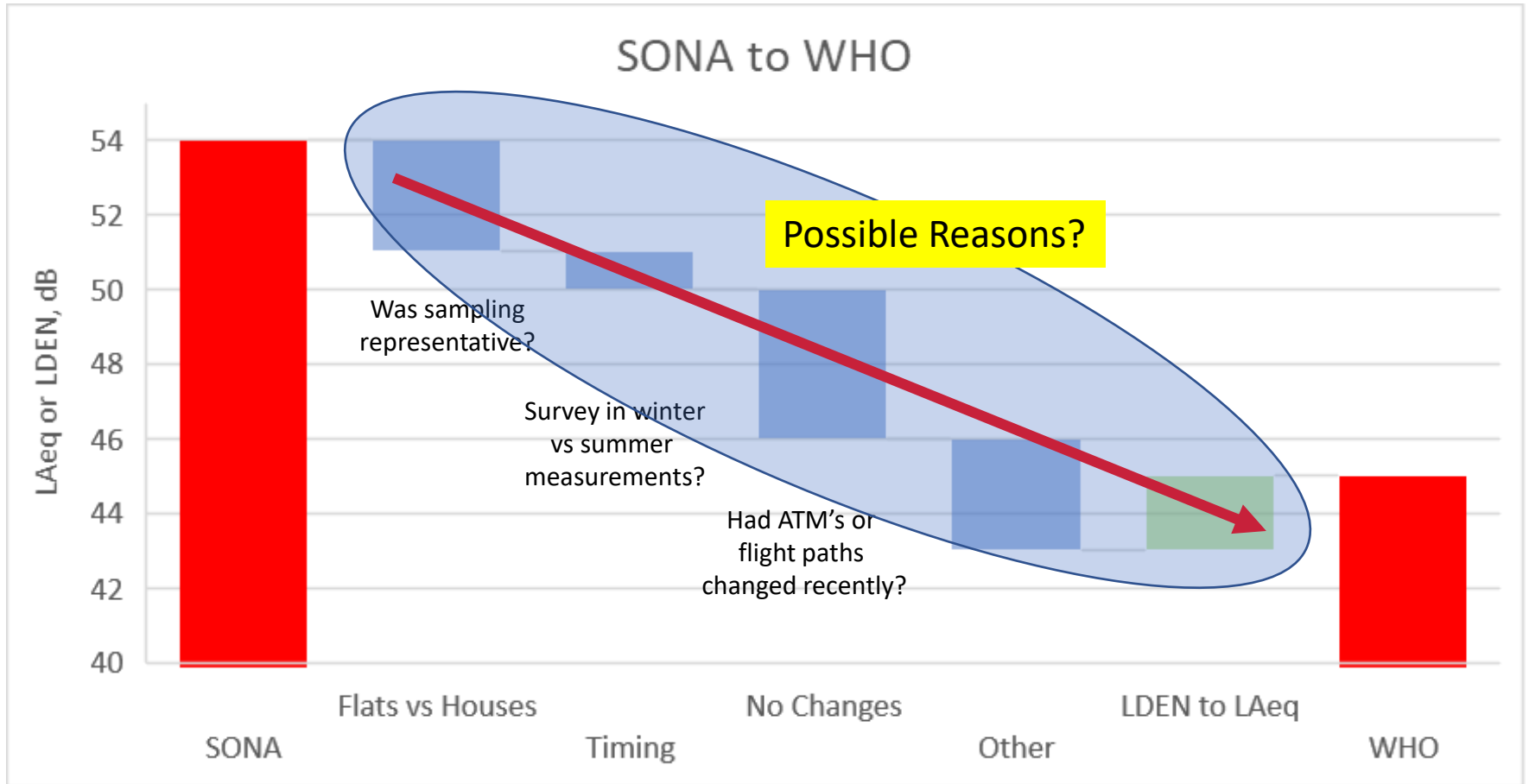
# Comparison of WHO 2018 noise guidelines vs SoNA and WebTAG impacts

HCNF 21<sup>st</sup> Nov Presented by Dave Gilbert for Community  
Noise Group (CNG)

# WHO guidelines now strongly recommend reducing noise levels produced by aircraft to below 45 dB $L_{DEN}$



# Proposed Project – Part 1 Independent Consultant to advise most likely reasons for differences



## SoNA

<2,000 Respondents  
 1 study run by CAA  
 2 reviewers (one noise,  
 one social science)

## WHO

17,094 Participants in  
 12 studies  
 International Panels of Expert Reviewers  
 Full WHO conflict of interest process

Context - The new 45dB  $L_{DEN}$  level is not a surprise - only a 3dB adjustment for Schiphol who have used 48  $L_{DEN}$  for many years to define their noise envelope

## Schiphol

Dutch Govt applies a Statutory Norm - Airport is not allowed to operate with more than 180,000 people impacted by severe noise level (48dB  $L_{DEN}$ ).

In 2016 this was 138,000.



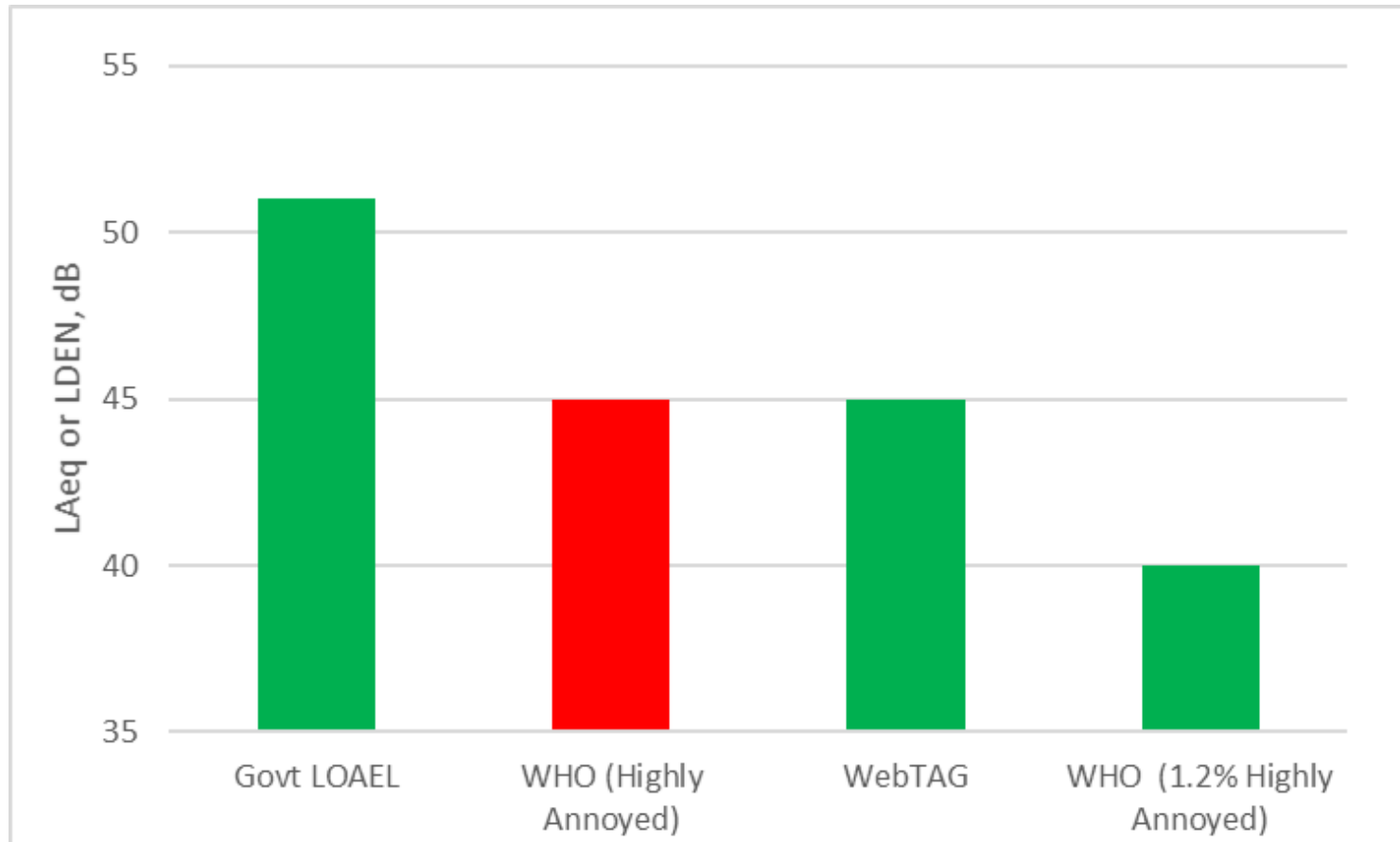
<http://www.annualreportschiphol.com/results/our-results/sustainable-safe-performance>

- Questions;
  - How many people does Heathrow impact at 45dB  $L_{DEN}$  and above today?
  - What does this decrease to in 2030 (e.g. WebTAG analysis for NPS)?
  - What does this impact look like with 3 runways?

Given the new guidelines these impacts should be known to inform policy

# Lowest Observable Adverse Effect Levels (LOAEL)

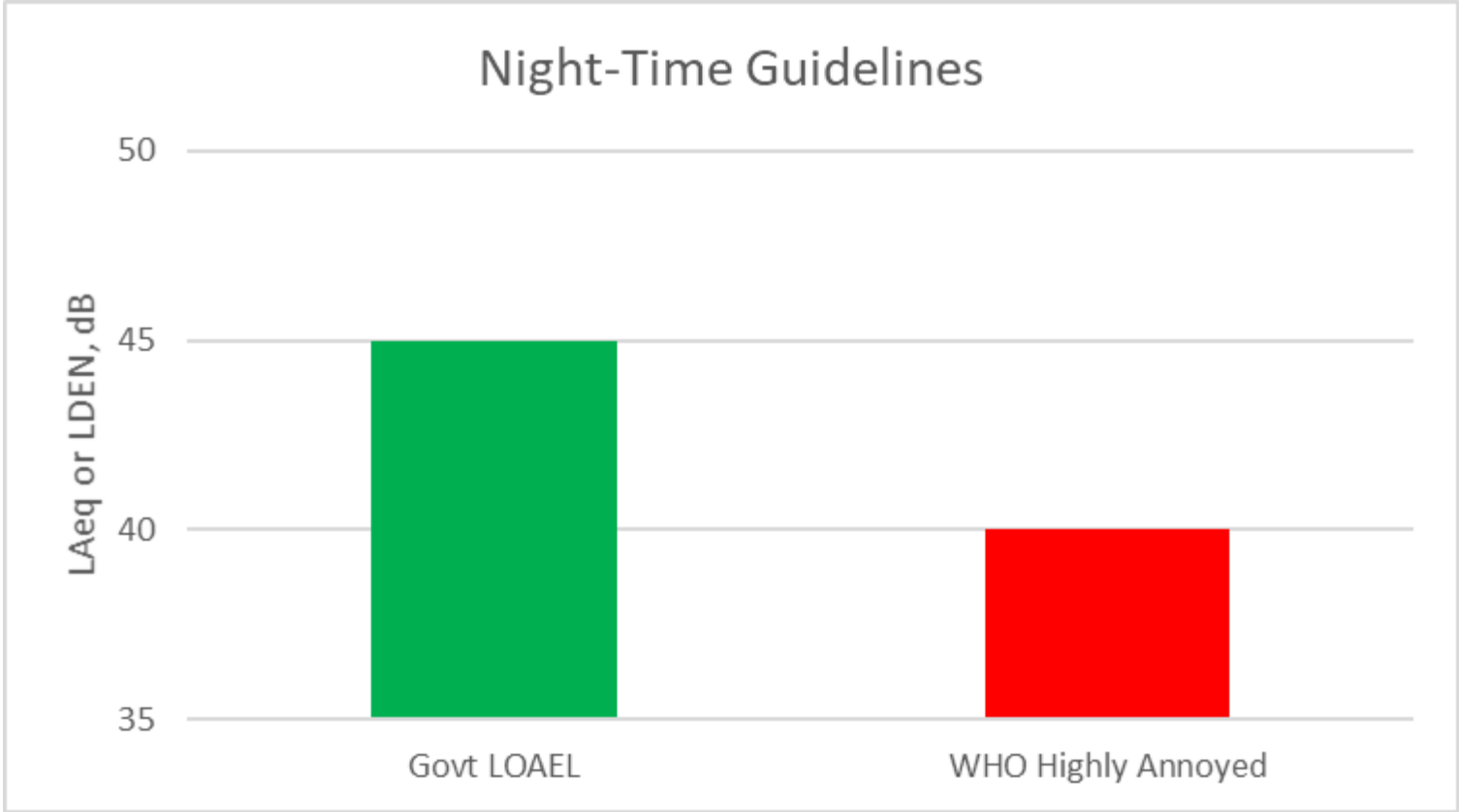
This is the level above which adverse effects on health and quality of life can be detected



Should the DfT now adjust the day-time LOAEL to 45dB or below?

This level is important as the DCO judges adverse effect on numbers impacted between SOAEL (Significant Observable Adverse Effect Level) and LOAEL

WHO guidelines now strongly recommend reducing noise levels produced by aircraft to below 40 dB  $L_{Aeq}$  between 11pm to 7am (defined as  $L_{night}$ )

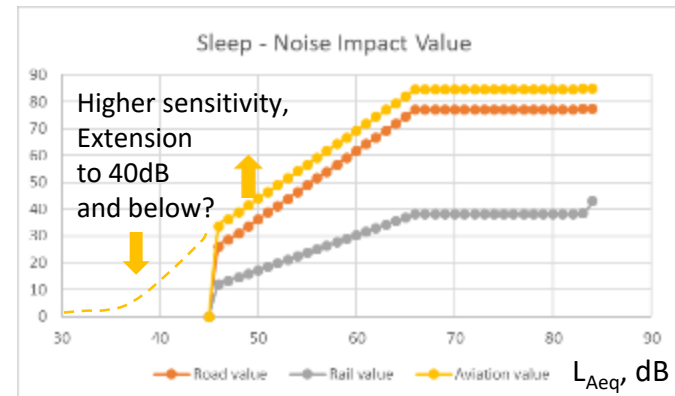
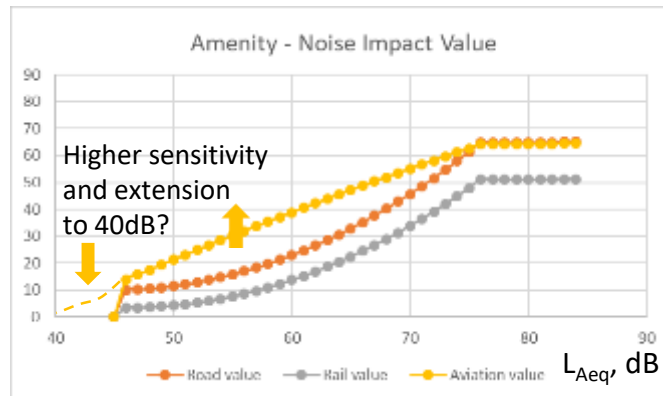


Should the DfT now adjust night-time LOAEL to 40dB or below?

# Proposed Project Part 2 – WebTAG Analysis

- Review noise impact figures used in WebTAG in light of WHO guidelines
  - WebTAG calculates negative economic impact of noise by multiplying numbers impacted by a monetary ‘impact value’
  - values were last set in 2014 ‘Environmental Noise: Valuing impacts on: sleep disturbance, annoyance, hypertension, productivity and quiet’ in a report informed by: the Interdepartmental Group on Costs and Benefits Noise Subject Group (includes Defra, DfH & DfT)
- Independent consultant should;
  - Explain the origin of impact numbers used and their confidence level
  - Given the new WHO guidelines indicate what impact values may need to be updated

Examples;



# Suggested Actions

- CNG provide ToR for study
  - Part 1 WHO and SoNA; Desk based Study with feedback sessions 6 weeks
  - Part 2 WHO and WebTAG; Desk based 4 weeks
- Request DfT to confirm numbers impacted at new WHO guideline levels today and in 2030 for 2 and 3 runway scenarios
- DfT address apparently inconsistent LOAEL day & night positions (vs internal Govt position & now WHO 2018) or otherwise explain position / LOAEL definition used for Govt Policy
- In all future noise assessments, including the DCO, Heathrow annual reports & CAA/ERCD should report noise impacts to WHO guideline levels



# Backups

## Appendix B: Noise Terminology

### How is noise level related to loudness?

Loudness is a subjective measure that describes the perceived strength of a sound. It is related to sound level but also related to other parameters such as frequency and duration. The table below provides an indication of the how the perceived loudness of a sound changes with an increase or decrease in sound level. For example, an increase of 10dB corresponds to a doubling of perceived loudness. It should be noted that the table below should only act as a guide to the relationship between level and perceived loudness – since loudness is a subjective measure, the same sound will not create the same loudness perception by all individuals

Level difference (dB)	Loudness Perception
+20dB	x 4
+10dB	x 2
+6dB	x 1.5
+3dB	x 1.2
±0dB	0
-3dB	÷ 1.2
-6dB	÷ 1.5
-10dB	÷ 2
-20dB	÷ 4

### How does average noise level relate to number of events?

Average noise levels ( $L_{Aeq,T}$ ) are determined by not only the level of individual aircraft events but also the frequency of which they occur. Due to the logarithmic nature in which noise is measured, a doubling of noise energy relates to a 3dB increase in average noise level. Therefore, if the number of events is doubled over a given time period (assuming the levels of individual events are the same), the  $L_{Aeq,T}$  will increase by 3dB. Likewise, a 26% increase in events will raise the  $L_{Aeq,T}$  by 1dB. Further factors are shown in the table below.

Number of Events	Noise level difference
x4	+6dB
x2	+3dB
x1.58	+2dB
x1.26	+1dB
0	0
÷1.26	-1dB
÷1.58	-2dB
÷2	-3dB
÷4	-6dB

# DCO Summary of 'Government Policy' (from Heathrow DCO scoping docs)

Table 16.7 LOAEL and SOAEL levels to be used in the assessment for residential receptors

LOAEL and SOAEL criteria			
Source	Period	Period noise level (outdoors, free-field <sup>119</sup> )	Maximum noise level (outdoors, free-field <sup>119</sup> )
<b>Construction</b>			
Site/Construction including borrow pits*	Daytime 0700 – 1900	LOAEL $L_{Aeq,T}$ >65dB SOAEL $L_{Aeq,T}$ >75dB	
	Evening 1900 – 2300 / Weekends	LOAEL $L_{Aeq,T}$ >55dB SOAEL $L_{Aeq,T}$ >65dB	
	Night time 2300-0700	LOAEL $L_{Aeq,T}$ >45dB SOAEL $L_{Aeq,T}$ >55dB	
<b>Operation</b>			
Airfield static	Day/Night time	6. Avoid likely significant effects by setting noise constraints set in line with BS 4142. <sup>118</sup>	
Aircraft noise / aircraft ground noise	Daytime	LOAEL 51dB $L_{Aeq,1hr}^b$ SOAEL 63dB $L_{Aeq,1hr}^c$	
	Night time	LOAEL 45dB $L_{Aeq,1hr}^b$ SOAEL 55dB $L_{Aeq,1hr}^c$	$L_{Amax}$ /number of events and a risk assessment of objective sleep disturbance
Road	Daytime	LOAEL 50dB $L_{Aeq,1hr}^d$ SOAEL 63dB $L_{Aeq,1hr}^e$	
	Night time	LOAEL 40dB $L_{Aeq,1hr}^d$ SOAEL 55dB $L_{Aeq,1hr}^e$	
Railway	Daytime	LOAEL 50dB $L_{Aeq,1hr}^d$ SOAEL 65dB $L_{Aeq,1hr}^e$	
	Night time	LOAEL 40dB $L_{Aeq,1hr}^d$ SOAEL 55dB $L_{Aeq,1hr}^e$	LOAEL $L_{Amax}$ , 60 dB (any event) SOAEL $L_{Amax}$ , 80dB (>20 pass-bys per night) or 85dB (< 20 pass-bys per night)

# WHO 2018

Table 30. The association between exposure to aircraft noise ( $L_{day}$ ) and annoyance (%HA)

$L_{day}$ (dB)	%HA
40	1.2
45	9.4
50	17.9
55	26.7
60	36.0
65	45.5
70	55.5

See p69 of full WHO report

