

**Before the Hearings Panel
At Waimakariri District Council**

Under the Resource Management Act 1991

In the matter of the Proposed Waimakariri District Plan

Joint Witness Statement – Acoustics – HS10A

Date: 22 March 2024

INTRODUCTION:

- 1 This Joint Witness Statement (JWS) relates to expert conferencing on noise issues related to Christchurch Airport.
- 2 The following participants were involved in this conferencing and authored this JWS:
 - (a) John-Paul Clarke for Momentum Land Limited and Mike Greer Homes Limited (JPC)
 - (b) William Reeve for Momentum Land Limited and Mike Greer Homes Limited (WR)
 - (c) Laurel Smith for Christchurch International Airport Limited (LS), and
 - (d) Jon Styles for Kainga Ora (JS).
- 3 An online meeting between the four experts was held on 22 February 2024 and this statement has been finalised by email.
- 4 In preparing this statement, the experts have read and understand the Code of Conduct for Expert Witnesses as included in the Environment Court of New Zealand Practice Note 2023¹.

PURPOSE AND SCOPE OF CONFERENCING:

- 5 The conferencing was initially focused on the main matters arising from the evidence of the participants. We were unable to collate a set of questions or topics for the Hearings Panel to consider and confirm before we met. We subsequently received and have also considered the questions contained within Minute 20.
- 6 The topics and individual issues that we have considered and commented on are set out in the table below.

¹ <https://www.environmentcourt.govt.nz/assets/Practice-Note-2023-.pdf>

CIAL noise modelling assumptions

1. We all agree that it is necessary to consider the individual and collective reasonableness of the noise modelling assumptions over the entire period being modelled.
2. We all agree that the CIAL modelling methodologies are allowed by NZS6805:1992.
3. Are the assumptions in the noise modelling appropriate?

JPC, JS and WR are concerned with the conservatism of the assumptions. In particular:

- a. Adopting the busiest 3 months to inform the outer envelope contours – JPC, WR and JS consider that the contours should be based on the annual average movements and contours. LS considers that both options are valid but the outer envelope (3 month) contours aligns with the guidance on NZS6805:1992.
 - b. 10% adjustment for climate change – we agree that this increases use of cross-wind runway and decreases use of main runway by a small amount.
4. Are the assumptions in the aircraft movement data and aircraft noise source characteristics appropriate?
 - a. JPC considers that the noise modelling should have incorporated the relevant data on retirement of the current fleet and future aircraft noise source characteristics, (for example, the data produced by ICAO). In the absence of this, he considers that the forecast duration should have been reduced to a period where this data becomes less important (e.g. 10-20 years used in the US). JS and WR consider that the modelling should have incorporated this data if it is available or reduced the forecast period as JPC sets out. LS states that the modelling has relied on the noise source data in the modelling software (which does not include the data that JPC is referring to).
 - b. JPC considers that the forecast duration (60 years) is too long and uncertain, and that the forecast period should have been reduced to the period for which we have greater certainty (to 2055). JS and WR consider that the forecast duration should be limited to a period for which reasonably certain data is available. JS is unsure of what that forecast duration should be but consider it likely that it is well less than 60 years. LS considers that the intent for the CIA contours is to model the runway capacity not a forecast duration. Although ultimate capacity is currently forecast to occur in 2084, it is possible it occurs sooner and with the current fleet. The regular review of CIA's contours, ensures that new data will be included at each revision when it becomes available (nominally every ten years).
 5. JPC has raised concerns about conformance to desired flight tracks and other airport / aircraft operational issues that are outside the expertise of WR, JS and LS. They have not been addressed in this statement.

Choice of regulatory noise metric and threshold for land use planning

1. We all agree that the L_{dn} metric is appropriate in this case.
2. We all agree that annoyance correlates with the L_{dn} metric, but that there is some uncertainty about the relationship. The percentage of people high annoyed at 55 dB L_{dn} varies depending on a range of circumstances, some of which are not noise related. JPC suggests that recent work indicates that annoyance does not reduce much when aircraft noise levels drop below 55 dB L_{dn} .
3. We all agree that most countries have imposed a regulatory threshold on aircraft noise exposure at around L_{dn} 55 dB. Australia also uses "Number Above" metrics and some countries use different non-daily average (e.g. L_{dn}) metrics for land use planning. JPC, JS and WR consider that 55dB L_{dn} is the appropriate threshold in this case. LS considers that there are noise effects below 55 dB L_{dn} and from a noise effects perspective, ideally noise sensitive activities would be avoided which supports the approach in Canterbury to use 50 dB L_{dn} for the onset of land use controls. However, we all agree that there are non-acoustic issues that need to be considered when determining the noise level threshold for land use planning.
4. JS, WR, JPC consider that the background noise environment should be considered when setting regulatory noise thresholds. This might result in higher noise thresholds for aircraft noise in areas already exposed to other higher noise levels (e.g. in urban areas and close to busy roads). JS, WR, JPC all agree that this would need to be assessed on a higher resolution basis across the district. LS considers that the background noise environment is a relevant consideration for noise effects assessment and may be relevant for regulatory thresholds. However, it is not always practicable to account for background noise on a macroscale. LS considers that different noise source characteristics and cumulative effects are also relevant.

**Relevance of noise
complaint data**

1. We all agree that annoyance and complaints are not tightly correlated.
2. We all agree that the distribution of complaints and their location is a useful consideration in understanding how the airport and its operations are perceived by the community. Analysing the complaints can help to understand which airport operations are the most problematic for the community (e.g. trialling new flight paths, night flights, engine testing or just general noise levels etc).
3. We all agree that the current complaints data shows that the complaints are 'scattered' across the region and do not correlate well with aircraft noise levels.
4. LS considers that complaint data is not predictive of reverse sensitivity effects that might result in operational constraints.

**Matters relating to
NOISE-R17**

1. We all agree that "A" can be deleted from dBA L_{dn}. All reference to L_{dn} noise levels or limits in the Noise Chapter should be written as "XX dB L_{dn}"
2. JS considers that any reference to L_{AE} noise levels, limits or contours in relation to aircraft or airport noise should be removed from the Noise Chapter, especially given that there are no L_{AE} contours available in this process, and that any L_{AE} contours held by the Council (and not published in the Plan) would not be controlled in terms of changes or updates. Additionally, the lack of L_{AE} contours and modelling means that their veracity and appropriateness cannot be reviewed by the noise experts in this process.
3. LS considers that indoor L_{AE} criteria in Table Noise-1 should remain because L_{AE} contours for design purposes are available separate to the planning maps which is also how Selwyn District and Christchurch City manage this.
4. WR considers that whether an L_{AE} contour is justified in this location and should influence controls in the Noise Chapter will depend on the extent of remodelled L_{AE} contours, which aircraft operation they represent, and how frequently the operation they represent occurs. At this stage he does not have the information available to make this judgement and understands the extent of the information available to be considered may be a legal scope question.
5. We all agree that houses between the 50 dB L_{dn} contour and 55 dB L_{dn} contour will achieve the indoor design noise level of 40 dB L_{dn} with windows closed and with windows ajar.
6. Based on (5), JS considers that NOISE-R17 can be deleted. LS considers NOISE-R17 relates to all noise sensitive activities (not just dwellings) and therefore should remain. WR and JPC consider that the other noise sensitive spaces referenced by NOISE-R17 are either equivalently, or less noise sensitive than a dwelling and many will achieve a similar outside to inside noise reduction in typical configurations. This demonstrates that when considering L_{dn} controls as per (5), this rule does not appear to be necessary.

**Panel Q1:
What is the level of
annoyance from
airport/aircraft related
noise that could be
equated to an adverse
effect on amenity
values?**

1. LS response is that if the question relates to:

What percentage of people highly annoyed could be equated to an adverse effect on amenity for a population?

Then LS considers there isn't a black and white threshold, it is a sliding scale where the severity of adverse amenity effect on a population increases with the prevalence of annoyance (which is a product of %HA and the number of people affected). Typically, a threshold of 10% is taken to be the indicator for the onset of an effect for the majority of a population. (i.e. 10% of the population is considered the most sensitive and not representative, but nonetheless this 10% still experience an adverse effect). WR agrees, noting that the magnitude of the noise effect would typically be balanced against other wider implications. This leads to the typical range of transportation environmental noise controls which commence at in the order of 10 – 25 % highly annoyed depending on the noise context.

2. JS considers that the effect of aircraft noise on amenity values is complex, and depends on a range of factors – many of which are outside the expertise of an acoustics experts, including social factors, attitudes towards the airport and airport noise and the expectations that might be set (in the Plan) about amenity and whether they are met. People that are very sensitive to noise may say there is an effect on amenity at very low levels of aircraft noise, and others may only report an effect at much higher levels. So the definition of or standardisation of amenity becomes very important. JS agrees with LS and WR that it is common to introduce planning controls when a percentage of people in the population become highly annoyed. The threshold varies depending on a variety of factors including the cost and effectiveness of mitigation, growth pressures, development type and it's sensitivity to noise, and more. JS considers that it is impracticable to determine an accurate estimate of the percentage of people that are highly annoyed in a specific town or area with mixed acoustic treatment, development typologies, attitudes and noise levels without carrying out a study of that population and assessing the data in a way that reflects the planned future development. Accordingly and given the challenges, planning provisions are typically based on a range of the percentage of people highly annoyed – typically from 10% to 25%.

**Panel Q2:
Can those annoyance
effects/effects on
amenity values be
mitigated?**

1. We all agree that acoustic insulation and ventilation could reduce the annoyance response however there is insufficient evidence to quantify this.
2. LS considers that limiting the number of people exposed to aircraft noise is an effective method of mitigating the prevalence or scale of annoyance effects. With respect to acoustic insulation and ventilation, LS refers to paragraphs 93 to 98 in her evidence. Acoustic insulation and ventilation is a compromise that has amenity side-effects and does not solve noise effects on outdoor living areas and noise effects via open windows.
3. JS, WR and JPC agree that there will be residual outdoor effects associated with a ventilated and acoustically insulated dwelling. While internal levels will be dependant on what reliance residents place on a fresh-air ventilation system, a well-performing system does provide an additional control at their discretion. While it is a compromise, acoustic insulation and ventilation is still a useful mechanism in areas where external noise levels are moderate – and offers particular benefits for the control of night-time noise.

Signed by:

John-Paul Clarke



Laurel Smith



William Reeve



Jon Styles



Date: 22 March 2024