



PEER REVIEW NZDF ENGINE TESTING NOISE PROPOSAL

**NOISE CONTROLS
WHENUAPAI 3 PRECINCT**

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ACOUSAPE CONSULTING & ENGINEERING LTD

A handwritten signature in black ink, appearing to read "Nigel Lloyd". The signature is fluid and cursive, with the first name "Nigel" and last name "Lloyd" clearly distinguishable.

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Introduction

Auckland Council has asked Acousafe to assist in the response to the New Zealand Defence Force (NZDF) position on the Whenuapai 3 Precinct Plan Change.

Acousafe has consulted with the NZDF independent acoustic consultant, Malcolm Hunt Associates (MHA), during the latter stages of the preparation of the noise predictions and assessment report. This review is based on the Report (**The Report**) version dated 24 August 2017¹.

Only the southern part of Whenuapai is included as part of this plan change, with the view to rezone land in the northern portion at a future date. No additional operational aircraft noise controls have been included on the basis that the Aircraft Noise Overlay provisions already manage aircraft noise from the base and Council does not have any data or evidence to support additional measures/controls beyond those noise contours.

Council agreed with NZDF that an acoustic specialist should separately assess the intensity, frequency and duration of engine testing noise. This work was initially perceived as engine testing noise monitoring but engine testing activity occurs at undefined times and there is a significant cost and difficulty in setting up separate noise testing and undertaking the measurements over a wide area of the neighbouring land.

It is accepted that the general approach taken by MHA is appropriate in the circumstances.

Scope

The scope, set out in Section 1 of the Report, is to determine the impact of engine testing noise beyond the existing Whenuapai Aircraft Noise Overlay to allow Council to determine what additional noise management controls are necessary and which insulation measures would be suitable for noise sensitive activities.

Noise Standards

The appropriate noise Standards are discussed in Section 2 of the Report. We recommend that, where practical, the noise requirements in the Precinct be made compatible with other provisions of the District Plan.

Rule D24.6.1 (for North Shore Airport, Kaipara Flats and Whenuapai) provides a maximum noise level for habitable rooms of 40 dB L_{dn}. It is sensible to also use this criterion for the engine testing noise. The Auckland Unitary Plan (AUP) generally relies on a 7 day rolling average for engine testing noise and Auckland International Airport uses a similar determinant.

We set out Rule D24.6.1 as follows:

¹ Airbase Auckland: Whenuapai, Noise from Aircraft Engine Testing, Noise Predictions & Assessment, Malcolm Hunt Associates, 24 August 2017.

(1) The following activities:

- D24.4.1(A1) New activities sensitive to aircraft noise; and
- D24.4.1(A3) Alterations or additions to existing buildings accommodating activities sensitive to aircraft noise

must provide sound attenuation and related ventilation and/or air conditioning measures:

- (a) to ensure the internal noise environment of habitable rooms does not exceed a maximum noise level of 40dB L_{dn} ;
- (b) that are certified by a person suitably qualified and experienced in acoustics to the Council's satisfaction prior to its construction; and
- (c) so that the related ventilation and/or air conditioning system(s) satisfies the requirements of New Zealand Building Code Rule G4 with all external doors of the building and all windows of the habitable rooms closed.

We agree with the Report that the engine testing noise should be assessed using a 7 day rolling average and that, otherwise, the 2008 versions of NZS 6801 and NZS 6802 are the appropriate Standards to rely upon.

Methodology

The methodology adopted by the Report is set out in Sections 4, 5 and 6.

These Sections describe the aircraft, the assumptions that have been made, the differences between the available noise information and the actual engine testing activities at Whenuapai and the precautions that have been taken. The sound data used provides some inherent safety factors.

The report reasonably adopts the 7 day rolling average L_{dn} taken from the actual worst case in Appendix B (between 9-15 June inclusive) to calculate the engine noise. This represents an actual scenario and while it may be exceeded from time to time, there will be many 7 day durations when the engine testing noise is less. The actual prediction of the noise also introduces safety factors into the process. Overall, we consider that the contours that are established in Figure 13 are reasonable.

One important consideration is that the base avoids undertaking night-time testing, where-ever it can, thus removing significant sleep interference issues. We would note that without night-time activity the L_{dn} is the same as L_{Aeq} (24 hours).

Predictions

The Report sets out its predictions in Sections 7, 8 and 9. The contours are usefully plotted over Precinct 3.

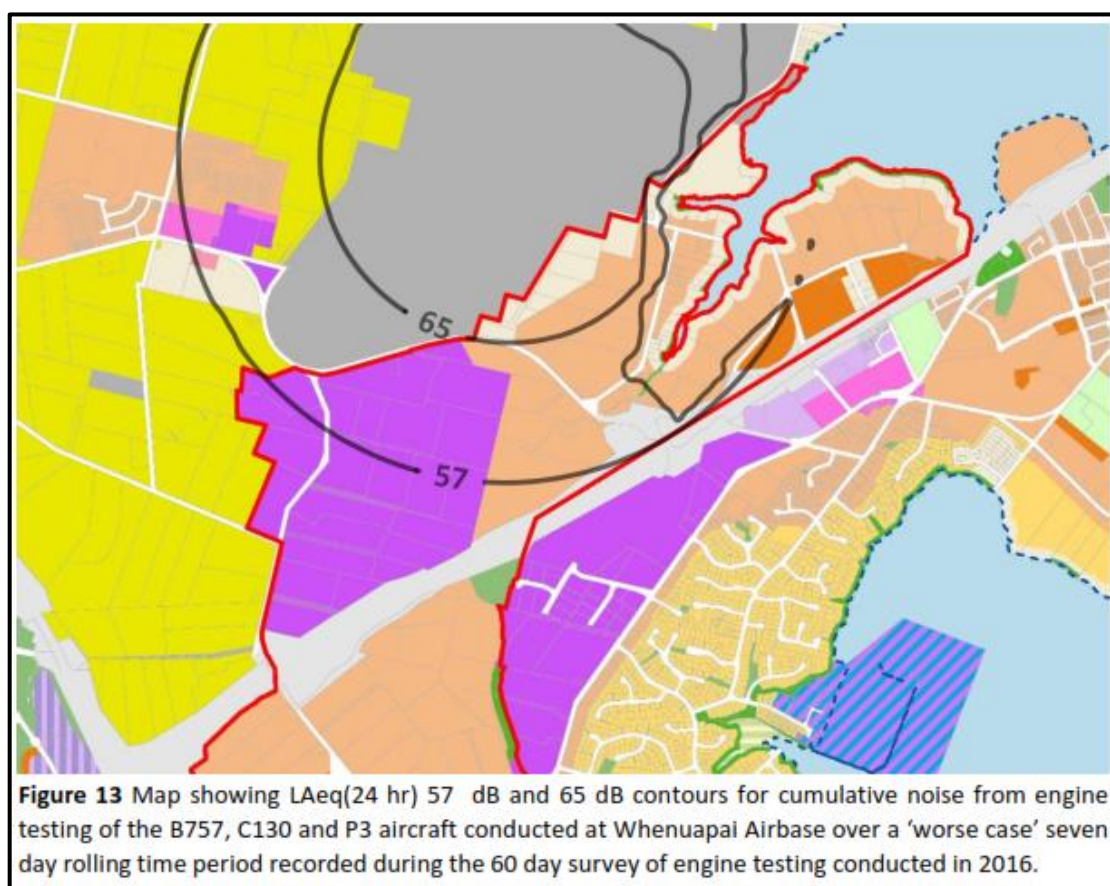
The predictions have been made at a height of 4.2 metres which is designed to cater for receivers located in the upper storey of a two storey dwelling. The engine testing noise level will be slightly less than the predicted level when considered at the ground elevation.

Figure 14 of the Report also shows the 55 dB L_{dn} operational aircraft noise contour for the airbase. The resource management considerations for engine

testing noise and for operational noise should be considered separately with the most stringent requirements applying from either activity.

Land Use Planning Response

Figure 13 of the Report provides for two contours describing the adverse noise impacts from aircraft engine testing taking place at Whenuapai Airbase. For clarity Figure 13 is repeated below.



In an ideal world, noise sensitive activities would be avoided within an area where levels are predicted to exceed 55 dB L_{dn} . However, the situation within the Whenuapai Precincts means that noise sensitive activities will inevitably be located in areas where aircraft noise and engine testing noise levels are less than ideal.

We support Council's response to the engine testing, which is to zone land within the 65 dB L_{dn} engine testing contour (and parts of the 57 dB L_{dn} contour) to non-residential and to zone the balance of land between the 57 dB L_{dn} contour and the 65 dB L_{dn} contour to Residential Single House Zone (also see below for Sinton Road). The noise insulation requirements for these dwellings are to be consistent with the D24.6.1 rule requirements; for maximum internal noise limits and ventilation and/or air conditioning. This zoning will limit the numbers of people exposed to the noise compared to zoning the land as Residential Mixed Urban, for example.

The 57 dB L_{dn} contour is used because a building which is ventilated with narrowly opened windows (or windows ajar) have been shown to achieve a

reduction of approximately 17 decibels. This reduces the inside noise to 40 dB L_{dn}. This is an appropriate indoor sound level which is consistent with Rule D24.6.1 particularly considering that engine testing noise only rarely occurs at night-time. On that basis, dwellings outside the 57 dB L_{dn} contour will inherently provide reasonable indoor sound environments without requiring mechanical ventilation.

A *finger* of the 57 dB L_{dn} contour runs along Sinton Road which can be seen in Figure 13. This *finger* identifies a relatively small area on a ridgeline that is slightly more exposed to engine testing noise. The noise level will only just be over 57 dB L_{dn} at a height of 4.2 metres and less than 57 dB L_{dn} at ground level.

We are strongly of the opinion that the contours should lay where they are predicted to fall (and not be artificially moved to cadastral boundaries for example). On that basis, any noise sensitive activities within the 57 dB L_{dn} finger would need to comply with the D24.6.1 rule requirements for insulation and ventilation. Given that the predicted noise levels along Sinton Road will just exceed 57 dB L_{dn} these requirements are not severe. The Proposed Zoning Map for this area within this *finger* shows Residential Mixed Urban Zone or Residential Terrace Housing and Apartments Building Zone. We consider that such zoning can remain given that the adverse noise impacts to the upper stories can be appropriately mitigated.

Consideration has been given to providing interim contours between the 57 dB L_{dn} contour and the 65 dB L_{dn}. This would assist with establishing the outside noise levels which would then aid the process of design for determining the level of noise insulation required to achieve the specified internal limit. However, the maximum noise level provided for in this area is 65 dB L_{dn} and the noise reduction is always going to be less than 25 decibels. Measurement of dwellings close to Wellington Airport has indicated that most well-constructed dwellings will achieve a noise reduction of 25 decibels with windows closed.

Conclusion

We have reviewed the assessment of engine testing noise prepared by Malcolm Hunt Associates. The Report provides for 57 dB L_{dn} and 65 dB L_{dn} contours. These contours allow land to be appropriately zoned and for development controls to be instigated within the Precinct Rules. We recommend that noise sensitive activities be prohibited within the 65 dB L_{dn} contour while the numbers of dwellings are controlled between the 57 dB L_{dn} contour and the 65 dB L_{dn} contour either by avoiding them or by limiting them using appropriate zoning mechanism. Noise Sensitive Activities within the 57 dB L_{dn} contour will be noise insulated and ventilated to allow windows to be kept closed against noise thus allowing reasonable internal noise limits to be met.

We consider that the zoning along Sinton Road where the 57 dB L_{dn} *finger* extends can remain as proposed in the Draft Whenuapai Plan Change. The slightly greater noise levels in this Precinct will be controlled by the Rules

within the Plan which will accommodate the higher population density that the zoning will encourage.

This District Plan response represents a consistent approach to controlling and managing the adverse impacts of engine testing noise at Whenuapai Airforce Base which has been reasonably predicted by the Malcolm Hunt and Associates Assessment Report.